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A General Review

Phenylketonuria[1]

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PHENYLKETONURIA, ALSO known as phenylpyruvic oligophrenia, is one of the hereditary abnormalities of metabolism. In phenylketonuria, the most striking clinical manifestation is severe mental deficiency. This sign and the presence of phenylpyruvic acid in the urine constitute the syndrome of phenylpyruvic oligophrenia.

This disorder has received much attention and a position of importance of late. This can be attributed to two important facts: (a) the disease can be detected easily early in life even before the onset of mental retardation; and (b) if the disease is diagnosed early, proper dietary management actually can prevent mental deficiency. Thus, phenylketonuria can rightly be called one of medicine's footholds in the prevention of mental deficiency. The term *oligophrenia*, which means "few brains" or "feeble-minded," need not be a part of the disease; thus the term, phenylketonuria, is probably a more suitable name.

Historical Background

The history of phenylketonuria from the time of its discovery to the present day is really quite fascinating. The story (1) goes back to Norway in the early 1930's when a mother of two retarded children was plagued by the observation that these children had a peculiar odor about them which distinguished them from normal children. Other people noticed this, too, and the mother sought help from a number of well known physicians. Finally, she prevailed on a distant relative, a biochemist by the name of Asbjörn Fölling, to examine these children. On examination, he discovered that a green color occurred when ferric chloride was added to the urine. He went further and successfully isolated and identified phenylpyruvic acid from the urine of these two mentally retarded children. Within a few months, he discovered eight additional cases, and he also described a number of the physical characteristics which are sometimes seen in these patients. He recorded the disease in the medical literature in 1934, calling it *imbecillitas phenylpyruvica* (2).

Incidence

The medical world, particularly those interested in the field of mental retardation, took up the study of analyzing the patients in existing institutions for mentally defectives (3-7). It was found that an amazing ½ to 1 per cent of the patients in such institutions had this particular disease (8). The sexes were equally affected. The disease occurred in all races but was more common perhaps in the Anglo-Saxon, Nordic, Irish, and Italian people and was particularly rare in peoples of Negro and Jewish ancestry. The disease was discovered to be familial, that is, frequently several children in a family were affected. When it was found that approximately one-fourth of the children in the involved families were affected, it was concluded that this was a simple autosomal recessive gene type of inheritance (4,7,9). This means that both parents are carriers of this gene, and the only children who manifest and show this disease are the homozygous, double-recessive offspring of such parents.

It was estimated from these statistics from mental institutions and a general population survey that this disease occurs once in about every 20,000 live births (10). Figuring from this, one can cal-

[1]Presented at the 42nd Annual Meeting of The American Dietetic Association in Los Angeles, on August 26, 1959.

[2]The following persons have been instrumental in the development of this paper: Phyllis B. Acosta, special diet recipes; Siegried A. Centerwall, M.D., and Ada Turner—proof reading; Albert Pusavat and Bob Sproed—laboratory technical assistance; Marcille Lawrence and Clarabelle Fenderson—secretarial assistance; M. D. Armstrong, Ph.D., and Asbjörn Fölling, M.D., Ph.D.—advice and encouragement; personnel of public health departments in California and the nursing staff of White Memorial Hospital Children's Clinic—field work detection; and personnel of Pacific State Hospital—patient material evaluation.

The author also wishes to acknowledge that his research efforts in detection and management of phenylketonuria are supported by a grant from the National Institutes of Health, No. M2323 (C1), a grant from the Alumni Association of the College of Medical Evangelists, and by generous assistance from Mead Johnson & Company.

culate that the carrier state exists in the general population in perhaps one out of every seventy individuals.

Clinical Picture

An examination of these institutionalized children revealed that most of them had a characteristic odor, described by some as a musty, horsy, barn-like, or stale gymnasium-like odor. The behavior was frequently noted to be hyperactive, irritable, destructive, and somewhat autistic in nature. These children generally did not have the lovable type of personality such as one sees in the Mongoloid child. There was a tendency for blondness; that is, 80 per cent of these children and adults were blonder than their parents and normal siblings. About 25 per cent had a history of convulsions or seizures, and almost 80 per cent had abnormal electroencephalograms. Approximately 20 per cent had eczema (11).

A significant discovery was made when the developmental histories of these defective children were analyzed. It was disclosed that these children were born normal, that the early months of infancy appeared to be normal. For example, at about one month these children were following with their eyes and smiling. However, by about four months of age, there seemed to be a setback. Gradually these children lost interest in the things in which they formerly had interest, and there was a slow, down-hill course, with progressive mental retardation, until by the age of two or three years over 90 per cent were in the imbecile-idiot range of mental retardation (8,12). The remainder were in the mildly retarded stage, and more recently, several untreated phenylketonurics have been discovered with low-normal to normal mentalities (8,13-17).

The average age for sitting alone for the untreated phenylketonuric was from twelve to fifteen months; for walking, two and one-half years; and for talking, between three and four years of age (11). Some children never learned to walk; many never learned to talk.

The Metabolic Defect

While these populations were being studied and analyzed, investigations of the abnormal metabolism were going on. It was found that these children have abnormally high phenylalanine blood levels. Phenylalanine is one of the amino acids found in all proteins. The serum phenylalanine level in a normal individual is between 1 and 3 mg. per 100 ml., and in these children it is between 15 and 60 mg.

In the normal individual with intact metabolism, phenylalanine is rapidly metabolized by a parahydroxalase enzyme (19,20) in the liver to tyrosine, and tyrosine in turn is metabolized through various metabolic pathways, including that of melanin or pigment metabolism. In the phenylketonuric, this enzyme in the liver is missing or abnormal through inheritance. This block results in an elevated serum phenylalanine level and spillage of by-products of phenylalanine into the urine. One by-product is phenylpyruvic acid which can be detected by the green color reaction with ferric chloride. The characteristic odor on the other hand is due to phenylacetic acid (21). This is derived either from the phenylpyruvic acid or from another urinary by-product, phenylacetyl glutamine. In either case, the urine must be standing an hour or more before the odor is detectable.

It appears that the mental deficiency in these children is due either directly or indirectly to the high phenylalanine level or to the associated metabolic products of the phenylalanine. The increase in blondness probably is due to the effect of the block between phenylalanine and tyrosine.

Treatment and Prevention

The question then arose, "If the phenylalanine level can be lowered, can the mental deficiency be cured?" An effort was made in the early 1950's to lower the level by means of a low-phenylalanine diet (22). This successfully reduced the serum level to normal, and some interesting findings were observed. The disagreeable behavior of these children improved on the special diet. Convulsions ceased, brain waves tended to revert to normal, and eczema, if present, cleared up. Unfortunately, although some improvements were noted, the mental deficiency did not return to normal (22).

The next objective was to test the low-phenylalanine diet on a small infant before the onset of mental retardation to see if such retardation could be prevented. It was difficult to obtain such an infant for experimentation, because parents who already had a defective phenylketonuric child realized that this was an inherited disorder, which at that time was untreatable, and they were reluctant to have more children. Also, the first several infants (actual siblings of phenylketonuric patients) to be tested were found to be normal. Finally, about four years ago, the first phenylketonuric infant was followed from birth (23). Since then, about a dozen such children have been discovered in early infancy and adequate tests made on them.

It is interesting to note that the phenylalanine level in the cord blood at birth is normal (24,25). However, within a day or two after birth, as the infant begins to take milk, either breast or cow's milk, the serum phenylalanine rises and phenylpyruvic acid begins to appear in the urine anywhere between one (25) to six (23) weeks of age.

The most important part of this research has been the result of the low-phenylalanine diet on these infants. Of the dozen or more such infants who have been so managed since early infancy, all that

I know of have been reported to be developing normally mentally.

The Diet

Something more should be said about this diet, because in the past it has been a problem to provide a satisfactory diet of this type for the older infants and children. I have seen a three-year-old child fight every spoonful of his new diet; whereas, his two-month-old brother completely accepted the change (26). This surely has been the experience of others. In the case of a small baby, the problem of acceptability is minimal, and it is easier to provide the essentials of a well balanced diet.

Practically all proteins in foods that have been tested contain about 5 per cent of phenylalanine by weight. Thus, it is impossible to provide a satisfactory home-prepared diet markedly deficient in phenylalanine and yet adequate in protein as required for growth and repair. The basis of the special diet is a synthetic mixture of essential amino acids which is made by hydrolyzing the milk protein (casein) and removing most of the phenylalanine. One such preparation[3] manufactured by a large drug firm is a casein hydrolysate amino acid powder. This powder is mixed at home with calculated amounts of oil or shortening, sugar, and water to make a formula or a paste depending on the requirements of the child. To me, this formula tastes something like peanut butter.

Another preparation[4] manufactured by a large firm specializing in nutrition products is a complete formula with fat, carbohydrate, and certain vitamins already added to the basic amino acid powder. One measure of this powder to 2 oz. water makes a standard 20-calorie-to-the-ounce formula which, to me, has a nut-like flavor. With either formula, it is perhaps wise to supplement the diet with extra vitamins and iron.

At the College of Medical Evangelists we have had experience with both products. The simple casein hydrolyzate amino acid mixture already has received adequate clinical trial, and a number of articles have been published describing its merits and efficacy. We can confirm these reports, but since we can add nothing new, most of my remarks will be concerned with the newer complete formula product.

At present, we have five infants and four slightly older children receiving this newer low-phenylalanine product. All nine accepted the formula with little or no hesitation. The mothers have been pleased with its milk-like appearance and consistency and the ease of preparation. (It never occurred to me that the appearance of a formula was important, even when given to a small infant who did not know or care about such things. Apparently it is, and I first learned this when I switched one of my infants from one formula to another. The mother remarked to me later that she was so pleased because the new product looked so much like milk that she no longer had to explain to people what she was feeding the child that looked so different.)

We have also found that weight gain has been more satisfactory even in early infancy when acceptability of the diet is not a problem. One five-month-old child on the diet gained 2 lb. 4 oz. in a three-week period. Bowel upsets also have been absent. As these infants grow larger, it becomes desirable to increase gradually the concentration of the formula so that adequate protein can be ingested without the excess fluid load. Some of the older children prefer to receive the powder mixed directly into the supplemental solid foods.

Low-Protein Supplements

To maintain a serum level of phenylalanine between 2 and 6 mg. per 100 ml. (this seems to be a satisfactory and safe range), it is necessary to add to the diet natural sources of low-protein foods equivalent to approximately 20 mg. phenylalanine per kilogram body weight per day (27). Requirements vary somewhat from child to child and age to age (young infants may require relatively more and older infants and children relatively less [18,29]; and regulation must be maintained by occasional serum phenylalanine determinations. The urine test is useful for detecting only gross malregulations in that the serum phenylalanine level may rise to 15 mg. per 100 ml. before any phenylpyruvic acid appears in the urine (10). Conversely, abnormally low levels may result in signs of phenylalanine deficiency, including growth retardation and a paradoxical rise in the serum phenylalanine level secondary to a breakdown of the body's own protein stores.

The necessary supplementary phenylalanine can be given in the form of milk in the formula; however, it is also advisable to use this opportunity to add solid foods to the diet. These solids provide desired roughage for the intestines, action for the jaws, and a more normal diet that is certainly preferable to both the child and the parents.

For this supplement, practically all fresh and canned fruits are suitable. Certain vegetables also are suitable, such as carrots, beets, parsnips, radishes, turnips, celery, lettuce, cucumbers, onions, egg plant, summer squash, and tomatoes. All these fruits and vegetables average less than 1 per cent protein by weight or conservatively less than 50 mg. phenylalanine per 100 gm. food or approximately 15 mg. per ounce.

Milk, which is about 3½ per cent protein, contains approximately 50 mg. phenylalanine per ounce. Thus, a two-month-old infant weighing 11 lb. or 5 kg. should have his diet supplemented with 5 times

[3]Ketonil by Merck, Sharpe, and Dohme.
[4]Lofenalac by Mead Johnson & Co.

20 or 100 mg. phenylalanine per day. This may be done by adding 8 oz. of selected solids or 2 oz. whole milk to the daily diet.

Additional variety is obtained by using low-protein cereals and by utilizing the special formula in the preparation of pastries, puddings, and the like.

It is not yet known how long it will be necessary to maintain these children on the special diet. There is some evidence from older children that would suggest that the special diet may not be necessary by school age. Meanwhile, the diet with added variety of natural foods can be quite pleasant. Then, too, it is possible that one day the missing enzyme can be identified and made available to affected individuals so that a special diet will not be necessary at any age.

Routine Detection Tests

Now that we have the exciting information that the mental deficiency of phenylketonuria can be prevented if the disease is diagnosed early enough, the question remains: how can this early diagnosis be accomplished? If we wait until the earliest symptoms of phenylketonuria appear, we have waited usually until there are signs of mental deficiency and probably some irreversible damage. If we discover these infants as most young infants have been discovered in the past, that is, by checking siblings of an already defective phenylketonuric child, then we have sacrificed a child, who potentially could have been normal, in order to know that we have phenylketonuria in that particular family.

Thus, the only real way to prevent this disease satisfactorily is to test routinely all well babies. This is the type of program that the Department of Pediatrics of the College of Medical Evangelists School of Medicine has undertaken in California (28). The project is concerned with the possibility of detecting cases of phenylketonuria in early infancy by means of a simple diaper test. This study has been possible through the excellent cooperation of a large number of the health departments in California which are performing this test on the many thousands of infants seen in their well baby clinics.

The test is a simple adaption of the standard urine test for phenylketonuria. We hope it will be proved that this simple and extremely inexpensive test should be a routine well-baby examination during the early months of life. The test consists of placing a drop of 10 per cent aqueous solution of ferric chloride on the infant's most recently wet diaper. A positive reaction is the immediate appearance of a blue-green or gray-green color. This color begins to fade within a minute.

There are a number of other substances which abnormally can appear in the urine to give color responses with ferric chloride. However, most of these cannot be confused very easily with the somewhat transient green color response of phenylpyruvic acid.

In practice, we find that approximately 30 per cent of the infants in an average clinic day will have no wet diaper available (29). Thus the chance of detecting a case of phenylketonuria will be increased considerably if at the time the parents are given the office or clinic appointment, they are told to bring along the most recently wet diaper with them.

The ferric chloride solution is quite stable for many months at room temperature, especially if plastic polyethylene squeeze dropper bottles are used (29). Any reserve stock of the solution is best stored in a refrigerator. If ever a solution of ferric chloride becomes markedly cloudy on shaking, the solution should be discarded.

It is important to know that from 5 to 10 per cent of the time, the test (diaper or test tube) is spontaneously negative in known cases of phenylketonuria (29). Thus, a test should be performed at least three times during subsequent visits in early infancy before one can conclude that phenylketonuria is not present. Seemingly positive or questionable diaper test results can be verified by mixing equal amounts of urine and an acid solution of 2,4 dinitrophenylhydrazine. A yellow turbidity should appear within a minute if phenylpyruvic acid is present. Finally, the diagnosis can be confirmed by a serum phenylalanine determination.

It is worth pointing out that the diaper test with ferric chloride is very inexpensive, each test costing only a fraction of a penny. Yet the savings to the state of each case diagnosed is approximately $100,000, the cost of the would-have-been life-time institutionalization of the patient. The value to the child and the parents, of course, is immeasurable.

Detection efforts elsewhere are being started and are in operation. For example, Woolf in England has advocated that all English babies be included in a detection program for phenylketonuria (30). The test in England is performed by adding a little 5 per cent ferric chloride to the solution of urine in a test tube and the green color response indicates a positive reaction.

In Cincinnati, Berry and Guest have instituted a program whereby filter paper is dampened with the baby's urine, and the dry filter paper is sent in to the medical center to be tested for the presence of phenylpyruvic acid (31). Also recently available are commercially prepared chemically treated paper strips[5] which turn green when coming in contact with urine containing phenylpyruvic acid (32).

There are thus a number of devices and interesting programs, each designed for the same purpose, that is, to detect the phenylketonuric baby early in

[5]Phenistix by the Ames Company.

infancy so that a special diet can be instituted and mental deficiency prevented. It matters little which test is used (29). The important thing is that some sort of screening program be instituted by private practitioners and clinics on perfectly well babies during early infancy. In this way we can learn more about this disease and prevent the serious mental deficiency which otherwise occurs in these babies.

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At Barnes Hospital, St. Louis, the Dietary Department no longer counts the menus individually for the patient census. The menus are weighed on a gram scale to determine the correct number, according to the annual report from the Department, issued at Christmas, last year.

Phenylketonuria: Dietary Management[1]

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BENEFICIAL RESULTS achieved by the administration of a diet low in phenylalanine to phenylketonuric children have been reported in the literature (1-6).

In treating the phenylketonuric patient by diet, we are faced with the problem of controlling the diet as carefully as is necessary for the patient with diabetes mellitus. Several comparisons may, in fact, be made between the two diets. In both, the quantity and quality of food consumed must be well controlled. Frequent testing of urine and blood is also important in both.

As has been emphasized, early detection of the disease and treatment by diet are most important in preventing the associated mental changes. In some cases, treatment must be instituted as early as four to six weeks of life to be maximally effective (7). At that age, milk is ordinarily the main food; however, due to its high phenylalanine content (approximately 50 mg. per ounce) (8,9), a substitute must be given. At least two low-phenylalanine preparations are now on the market: one a casein hydrolysate, amino-acid preparation[2]; the other, a casein hydroylsate with added fats, carbohydrates, vitamins, and minerals[3]. The composition of these products has recently been reported (10). In the recipes developed and in the work done in the Department of Pediatrics, College of Medical Evangelists, the second preparation has been used exclusively.

Due to the fact that phenylalanine is an essential amino acid, it must not be removed completely from the diet. Tentative minimum quantities necessary for maintenancy in young adult males have been proposed at 1.1 gm. L-phenylalanine daily (11), with tyrosine exerting a 70 to 75 per cent sparing effect on the phenylalanine needs of the organism (12). The phenylalanine requirement of normal infants has been found to range from 60 to 90 mg. per kilogram per day (13). In a study done by Paine and Hsia (5), the phenylalanine need of a six-month-old infant with phenylketonuria appeared to be approximately 25 mg. per kilogram per day. For a fifteen-year-old boy with phenylketonuria, the possible daily range for phenylalanine need was given as 5 to 15 mg. per kilogram.

The actual amount of phenylalanine required to maintain normal blood levels in the phenylketonuric patient seems to vary with each patient and with different investigators. Armstrong and co-workers (14) suggest 25 mg. phenylalanine per kilogram per day. Centerwall (15) recommends, in addition to the casein hydrolysate given to cover basic protein needs, 20 mg. per kilogram per day in the form

[1]Presented at the 42nd Annual Meeting of The American Dietetic Association in Los Angeles, on August 26, 1959.

[2]Ketonil by Merck, Sharpe, and Dohme.

[3]Lofenalac by Mead Johnson & Company.

TABLE 1 **Food values for calculating low-phenylalanine diets**

GROUP	AMOUNT	PHENYL-ALANINE	PROTEIN	FAT	CARBO-HYDRATE	CALORIES
		mg.	*gm.*	*gm.*	*gm.*	
Lofenalac	1 c.	30	6.0	7.0	22.0	175
Vegetables	varies*	15	0.3	—	1.0	5
Fruits	varies*	15	0.2	—	20.0	80
Breads	varies*	30	0.5	—	5.0	20
Fats	varies*	5	0.1	5.0	0	45
Desserts	varies*	15	1.0*	5.0†	35.0†	185†
Free foods	—	0	0	varies	varies	varies
Foods not allowed	none	0	0	0	0	0

*Measures appear in Exchange Lists in Table 2.

†Averages of special dessert recipes.

TABLE 2 Exchange lists for low-phenylalanine diet

FOOD	AMOUNT
List I—Lofenalac; 30 Mg. Phenylalanine—2 Equivalents*	
Lofenalac† (dry)	4 Tbsp.
Lofenalac (reconstituted)	1 c.
List II—Vegetables; 15 Mg. Phenylalanine—1 Equivalent	
Beans, green	
Strained and junior	1½ Tbsp.
Regular	3 Tbsp.
Beets	
Strained	2 Tbsp.
Regular	3 Tbsp.
Cabbage, raw, shredded	4 Tbsp.
Carrots	
Strained and junior	3 Tbsp.
Raw	¼ large
Canned	4 Tbsp.
Celery, raw	1½ small stalks
Cucumber, raw	⅓ medium
Lettuce, head	2 leaves
Spinach, creamed—strained and junior	1½ Tbsp.
Squash	
Winter	
Strained	3 Tbsp.
Junior	6 Tbsp.
Cooked	2 Tbsp.
Summer, cooked	4 Tbsp.
Tomato	
Raw	¼ small
Canned	2 Tbsp.
Juice	2½ Tbsp.
List III—Fruits; 15 Mg. Phenylalanine—1 Equivalent	
Banana	4 Tbsp.
Dates, dried	2
Fruit cocktail, canned	2½ Tbsp.
Grapefruit	
Sections	⅓ c.
Juice	⅓ c.
Orange	
Sections	3 Tbsp.
Juice	3 Tbsp.
Grape juice	⅓ c.
Lemon juice	3 Tbsp.
Peaches	
Raw	⅓ medium
Canned in sirup	1½ halves
Strained	5 Tbsp.
Junior	7 Tbsp.
Pears	
Raw	⅓ medium
Canned in sirup	3 halves
Strained and junior	10 Tbsp.
Pears and pineapple, strained and junior	7 Tbsp.
Pineapple	
Raw	⅓ c.
Canned in sirup	1½ small slices
Juice	½ c.
Plums, canned in sirup	1½ medium
Plums with tapioca	
Strained	5 Tbsp.
Junior	7 Tbsp.
Prunes	
Cooked	2 medium
Juice	⅓ c.
Strained	3 Tbsp.
Raisins	1½ Tbsp.
Strawberries	3 large
Tangerine	⅔ small
Watermelon	⅔ c.
List IV—Breads; 30 Mg. Phenylalanine—2 Equivalents	
Barley cereal, Gerber's, dry	2½ Tbsp.
Biscuits‡	1 small
Cereal food, Gerber's, dry	2 Tbsp.
Cookies, arrowroot	1½
Corn	2 Tbsp.
Cornflakes	½ c.
Crackers	
Barnum animal	6
Saltines	3

*One equivalent may be defined as providing 15 mg. phenylalanine.
†Mead Johnson & Company.

TABLE 2—Concluded

FOOD	AMOUNT
List IV—Concluded	
Cream of Wheat, cooked	2 Tbsp.
Farina, cooked	2½ Tbsp.
Ice cream‡#	
Chocolate	⅓ c.
Pineapple	⅓ c.
Strawberry	⅓ c.
Vanilla	⅓ c.
Mixed cereal, Pablum, dry	1⅔ Tbsp.
Oatmeal	
Gerber's strained	1⅔ Tbsp.
Pablum, dry	1⅔ Tbsp.
Potatoes, Irish	2½ Tbsp.
Rice Flakes, Quaker	⅓ c.
Rice Krispies, Kellogg's	⅓ c.
Rice, Puffed, Quaker	½ c.
Sugar Crisps	¼ c.
Sweet potatoes or yams	
Cooked	3 Tbsp.
Strained	4 Tbsp.
Wafers, sugar, Nabisco	6
Wheat, Puffed, Quaker	⅓ c.
List V—Fats; 5 Mg. Phenylalanine—⅓ Equivalent	
Butter	1 tsp.
Cream, heavy	1 tsp.
Margarine	1 Tbsp.
Mayonnaise	1½ Tbsp.
Olives, ripe	1 large
List VI—Desserts; 15 Mg. Phenylalanine—1 Equivalent	
Cookies	
Rice flour (19)	1
Corn starch (19)	1
Ice creams—see List IV, Breads	
Puddings‡	½ c.
Sauce, Hershey sirup	1 Tbsp.
List VII—Free Foods; Little or No Phenylalanine; May Be Used as Desired	
Candy	
Butterscotch	—
Cream mints	—
Fondant	—
Gum drops	—
Hard	—
Jelly beans	—
Lollipops	—
Cornstarch	—
Guava butter	—
Honey	—
Jams, jellies, and marmalades	—
Molasses	—
Oil	—
Sauces	
Lemon‡	—
White‡	—
Sirups	
Corn	—
Maple	—
Sugar	
Brown	—
White	—
Tapioca	—
List VIII—Foods to Avoid; High Phenylalanine Content; May Be Used Only Occasionally in Very Small Portions	
Breads, most	—
Cheeses of all kinds	—
Eggs	—
Legumes, dried	—
Meat, poultry, fish	—
Nuts	—
Nut butters	—

‡Special recipe must be used.
#Milk is very high in phenylalanine (1 oz. contains 50 mg.), but it may on occasion be ordered to bring phenylalanine blood levels up to normal.

Formulas for seven low-phenylalanine puddings

INGREDIENTS	TAPIOCA	PINEAPPLE TAPIOCA	VANILLA PUDDING	BANANA PUDDING	PINEAPPLE PUDDING	LEMON PUDDING	CHOCOLATE PUDDING
Dry Lofenalac (Tbsp.)	2	2	5	5	3*	3*	3*
Water, boiling (c.)	1	1	1½	1½	1½	1¼	1½
Sugar (c.)	¼	¼	½	½	½	½	½
Cornstarch (Tbsp.)	—	—	2	2	2	2	2
Salt (tsp.)	⅛	⅛	⅛	⅛	⅛	⅛	⅛
Oil (Tbsp.)	—	—	1	1	1	1	1
Vanilla (tsp.)	½	½	2	2	1	—	1
Quick-cooking tapioca (Tbsp.)	2½	2½	—	—	—	—	—
Lemon juice (Tbsp.)	—	—	⅓	—	—	3	—
Pineapple, crushed (Tbsp.)	—	4†	—	—	4	—	—
Grated lemon rind (tsp.)	—	—	—	—	—	1	—
Chocolate, unsweetened (oz.)	—	—	—	—	—	—	½
Mashed banana (Tbsp.)	—	—	—	2	—	—	—
Banana flavor (tsp.)	—	—	—	1	—	—	—
Pineapple juice (c.)	—	—	—	—	¼	—	—
Yield (c.)	1	1	1½	1½	1½	1½	1½
Size of serving (c.)	½	½	½	½	½	½	½
Protein (gm./serving)	1.5	1.6	2.2	2.5	1.6	1.5	1.5
Fat (gm./serving)	1.7	1.7	7.5	7.6	6.4	6.6	7.6
Carbohydrate (gm./serving)	41.6	51.1	47	53.0	49.6	44.5	44.1
Phenylalanine (mg./serving)	14.2	19.2	14	16.0	16.0	13.0	14.6
Calories per serving	188	226	264	290	262	243	250

*6 Tbsp. Lofenalac may be used without altering the taste of the product.

†2½ Tbsp. junior peaches may be substituted for crushed pineapple. Phenylalanine content is then reduced to 17.7 mg. Other nutrients remain the same.

Formulas for four types of ice cream low in phenylalanine

INGREDIENTS	CHOCOLATE ICE CREAM*	PINEAPPLE ICE CREAM†	STRAWBERRY ICE CREAM‡	VANILLA ICE CREAM#
Water (c.)	¼	—	¼	¼
Cornstarch (Tbsp.)	2	2	2	2
Chocolate, unsweetened (oz.)	½	—	—	—
Cream (30-40% butterfat) (c.)	1	1	1	1
Sugar (Tbsp.)	6	4	6	6
Vanilla (tsp.)	1	—	—	3
Pineapple juice (c.)	—	¼	—	—
Pineapple, crushed (c.)	—	½	—	—
Lemon juice (Tbsp.)	—	1	1	1
Strawberries, fresh (c.)	—	—	½	—
Yield (c.)	3	3	3	3
Size of serving (c.)	⅓	⅓	⅓	⅓
Protein (gm./serving)	0.6	0.6	0.6	0.6
Fat (gm./serving)	7.2	6.4	6.4	6.4
Carbohydrate (gm./serving)	13.0	13.0	13.0	13.0
Phenylalanine (mg./serving)	31.0	32.0	30.0	28.0
Calories per serving	119	112	112	112

*Heat together in double boiler the water and chocolate until chocolate is melted. Add cornstarch and cook until thickened. Refrigerate until cool. Beat cream until it stands in peaks but is not buttery. Add sugar and vanilla. Fold in chocolate mixture and combine thoroughly. Freeze.

†Mix together sugar, lemon juice, cornstarch, and pineapple juice and cook in double boiler until thickened. Cool. Beat cream until it stands in peaks but is not buttery. Fold in crushed pineapple and above mixture. Freeze.

‡Mix together sugar, water, lemon juice, and cornstarch in double boiler and cook until thick. Cool. Beat cream until it stands in peaks but is not buttery. Fold in fresh sliced strawberries and above mixture. Freeze.

#Mix together sugar, water, lemon juice, and cornstarch in double boiler and cook until thick. Cool. Beat cream until it stands in peaks but is not buttery. Fold in vanilla and above mixtures. Freeze.

of natural foods. Requirements vary from age to age (young infants may require relatively more and older infants and children relatively less). Most food proteins contain approximately 4 to 6 per cent phenylalanine (7).

After an initial depletion period of one to two weeks, during which time the patient is given only the low-phenylalanine formula, more foods are added to maintain the blood phenylalanine levels between 2 to 6 mg. per 100 ml. Usually 3 to 8 gm. protein can be given (16). Blainey and Gulliford (17) feel that a high-carbohydrate diet with 110

TABLE 3 **Prescription for low-phenylalanine diet for one-year-old child weighing 10 kg.**

LIST	NUMBER OF EQUIVALENTS	PHENYL-ALANINE	PROTEIN	FAT	CARBO-HYDRATE	CALORIES
		mg.	*gm.*	*gm.*	*gm.*	
I—Lofenalac	10	150	30.0	35	110	875
II—Vegetables	2	30	0.6	—	2	10
III—Fruits	2	30	0.4	—	40	160
IV—Breads	2	30	0.5	—	5	20
V—Fats	0	—	—	—	—	—
VI—Desserts	1	15	1.0	5	35	185
Total	17	255	32.5	40	192	1250

calories per kilogram per day should be the goal.

Lists of Equivalents

In planning a diet for infants and children with phenylketonuria, the possibility of lists, placing comparable foods of approximately the same phenylalanine content together, was evolved. Previous work has been done in this area by Lyman (18). Foods are broken down into eight classifications as follows: List I, the low-phenylalanine formula which is the basis for the diet and contains approximately 30 mg. or two equivalents[4] of phenylalanine; List II, the vegetables containing approximately 15 mg. or one equivalent of phenylalanine; List III, the fruits with 15 mg. phenylalanine or one equivalent of phenylalanine; List IV, the breads with 30 mg. or two equivalents; List V, the fats with 5 mg. or one-third equivalent; List VI, desserts with 15 mg. phenylalanine, or one equivalent; List VII, free foods; and List VIII, foods to avoid.

The lists, amount of food, the phenylalanine content, and proximate composition of the foods in each group are given in Table 1. The amount of each food within the lists is shown in Table 2, while in Table 3 is presented a diet broken down into exchanges which might be prescribed for a one-year-old child weighing 10 kg. or 22 lb. The physician would plan the diet or prescribe the amount of phenylalanine, protein, fat, and carbohydrate, much as he would prescribe a diet for a patient with diabetes.

List VI includes desserts. In serving desserts, the accompanying recipes must be followed to maintain the low-phenylalanine levels. The development of recipes low in phenylalanine poses a problem in itself. Products containing even small amounts of protein must be used in minute quantity. Fruit-flavored puddings may be made by incorporating the low-phenylalanine formula in lieu of milk. Tapioca or cornstarch may be used as thickeners. Some ready mixed puddings are also available which may be used with the substitution of equal amounts of the liquid low-phenylalanine formula for the milk ordinarily used. These pudding mixes should not contain milk or milk products, eggs, wheat products, or gelatin. Baked goods, such as cookies, biscuits, and shortcake, may be made using cornstarch and low-gluten flours which are highly refined, such as cake flour, arrowroot flour, rice flour, light rye flour, and light buckwheat flour. Ice creams, listed with breads, may also be made, but the fat content must be very high to avoid the inclusion of milk proteins.

Sauces, such as lemon and white sauce, may be made with the low-phenylalanine formula. The former may be served with desserts, and the latter with vegetables to increase the protein content without appreciably increasing the phenylalanine intake.

Recipes which are in actual use by some of our patients are presented on page 210. The quality of the products cannot in all respects be equal to that of products in which there need be no restriction of protein content; however, to children who are acquainted with and have accepted the taste of the low-phenylalanine formula, the desserts provide pleasant variety and help to increase the protein content of the diet.

As mentioned earlier, the length of time the diet must be continued is, at present, not known. Perhaps in the future, the missing enzyme will be isolated and utilized. Until then, however, we must strive to prevent, by diet, the mental changes associated with phenylketonuria.

[4]One equivalent may be defined as 15 mg. phenylalanine.

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Recipes

White Sauce

3 Tbsp. oil
2 Tbsp. cornstarch
1 tsp. salt
½ c. dry Lofenalac
2 c. warm water

Place oil in saucepan. Add cornstarch and salt and blend well. Mix together Lofenalac and water, using rotary beater to blend well. Add to oil-cornstarch-salt mixture and cook until thickened. Two Tbsp. chopped parsley may be added for variety. *Yield:* about 2 c. *Nutrients per 2-Tbsp. serving:* 0.7 gm. protein, 3.5 gm. fat, 3.6 gm. carbohydrate, 4 mg. phenylalanine, 48 calories.

Lemon Sauce

½ c. sugar
1½ Tbsp. cornstarch
¼ tsp. salt
5 Tbsp. dry Lofenalac
1½ c. boiling water
2 Tbsp. oil
3 Tbsp. lemon juice
2 tsp. grated lemon rind

Mix together sugar, cornstarch, salt, and dry Lofenalac. Gradually add water. Cook over medium heat, stirring constantly, until sauce thickens and comes to boil. Boil 2 min. Remove from heat and add oil, lemon juice, and rind. Use as topping for puddings. *Yield:* about 2 c. *Nutrients per 2-Tbsp. serving:* 0.5 gm. protein, 2.3 gm. fat, 8.7 gm. carbohydrate; 3.1 mg. phenylalanine; 57 calories.

Blanc Mange

½ c. sugar
5 Tbsp. cornstarch
¼ tsp. salt
1 c. dry Lofenalac
4 c. boiling water
2 tsp. vanilla

Mix sugar, cornstarch, and salt in top of double boiler. Mix Lofenalac with boiling water. Gradually add to cornstarch mixture, mixing until smooth. Place over boiling water and cook, stirring constantly until mixture thickens. Cover and continue cooking 10 min. longer. Remove from heat and add vanilla. Cool. May be served with Karo, jelly, honey, or jam. *Yield:* 8 ½-c. servings. *Nutrients per serving:* 2.4 gm. protein, 3.4 gm. fat, 27.8 gm. carbohydrate, 16 mg. phenylalanine, 151 calories.

Biscuits or shortcake

1 c. sifted, superfine cake flour
1½ tsp. baking powder
½ tsp. salt
2 Tbsp. oil
⅓ cup cold water

Sift together flour, baking powder, and salt. Combine oil and water. Pour at one time over entire surface of flour mixture. Mix with fork until soft dough is formed. Shape lightly with hands to make a round ball. Place on wax paper and knead lightly until smooth. Roll between two squares of wax paper and cut with 1½-in. cutter. (Size of biscuit is very important, since a larger size will provide more phenylalanine.) Place on ungreased baking sheet. Bake at 450° F. for 10 to 12 min. *Yield:* 12 small biscuits. *Nutrients per biscuit:* 0.6 gm. protein, 1.9 gm. fat, 6 gm. carbohydrate, 31 mg. phenylalanine, 44 calories.

VARIATIONS: *Light* buckwheat flour, *light* rye flour, or pastry flour may be substituted for the cake flour.

Rice Flour Cookies

½ c. cornstarch
½ c. confectioner's sugar
1 c. white rice flour
¼ tsp. salt
1 c. butter or oil
¼ tsp. vanilla

Sift together cornstarch, sugar, flour, and salt. Blend room-temperature butter (or oil) into dry ingredients with fork until a soft ball is formed. Shape into small ball with hands. Place on ungreased baking sheet about 1½ in. apart. Flatten cookies with lightly floured fork. Bake in 300°F. oven for 20 to 25 min. *Yield:* about 2 doz. small cookies. *Nutrients per cookie:* 0.3 gm. protein, 5 gm. fat, 7 gm. carbohydrate, 14.7 mg. phenylalanine (if oil is used, phenylalanine content is slightly decreased), 74 calories. Adapted from *Allergy Recipes* (19).

Cornstarch Cookies

1 c. unsifted cornstarch
1 tsp. baking powder
¼ tsp. salt
⅓ c. oil or butter
½ c. sugar
2 Tbsp. corn sirup
1 unbeaten egg
2 tsp. vanilla

Sift together cornstarch, salt, and baking powder. Mix oil (or room-temperature butter), sugar, sirup, egg, and vanilla in bowl. Beat with hand-beater until thoroughly blended. Add sifted dry ingredients and mix well. Cover baking sheet with brown paper; do not grease. Drop batter by teaspoonful 3 in. apart on paper. Bake in 350°F. oven for 12 min. Cool slightly before removing from baking sheet. *Note:* 1 tsp. cinnamon or nutmeg makes a pleasing variation. *Yield:* 18 cookies. *Nutrients per cookie:* 0.3 gm. protein, 4.3 gm. fat, 13.4 gm. carbohydrate, 17.9 mg. phenylalanine (if butter is used, phenylalanine content is slightly increased), 94 calories. Adapted from *Allergy Recipes* (19).

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Metropolitan's Revised Tables on *Desirable* Weight—1959

As an outgrowth of new data on height and weight released by the Society of Actuaries in its report, *1959 Build and Blood Pressure Study, Vol. I,* (see the December 1959 issue of the JOURNAL, page 1254, and the January 1960 issue, page 45), the Metropolitan Life Insurance Company's Statistical Bureau has developed new standards of *desirable* weight, i.e., weights associated with lowest mortality. These were published in the November-December 1959 issue of the company's *Statistical Bulletin* and are reproduced here by permission.

Desirable weights for men and women, according to height and frame, ages 25 and over*

HEIGHT (in shoes)	WEIGHT IN INDOOR CLOTHING		
	Small frame	Medium frame	Large frame
	Men		
	lb.	*lb.*	*lb.*
5 ft. 2 in.	112–120	118–129	126–141
5 ft. 3 in.	115–123	121–133	129–144
5 ft. 4 in.	118–126	124–136	132–148
5 ft. 5 in.	121–129	127–139	135–152
5 ft. 6 in.	124–133	130–143	138–156
5 ft. 7 in.	128–137	134–147	142–161
5 ft. 8 in.	132–141	138–152	147–166
5 ft. 9 in.	136–145	142–156	151–170
5 ft. 10 in.	140–150	146–160	155–174
5 ft. 11 in.	144–154	150–165	159–179
6 ft.	148–158	154–170	164–184
6 ft. 1 in.	152–162	158–175	168–189
6 ft. 2 in.	156–167	162–180	173–194
6 ft. 3 in.	160–171	167–185	178–199
6 ft. 4 in.	164–175	172–190	182–204
	Women		
4 ft. 10 in.	92– 98	96–107	104–119
4 ft. 11 in.	94–101	98–110	106–122
5 ft.	96–104	101–113	109–125
5 ft. 1 in.	99–107	104–116	112–128
5 ft. 2 in.	102–110	107–119	115–131
5 ft. 3 in.	105–113	110–122	118–134
5 ft. 4 in.	108–116	113–126	121–138
5 ft. 5 in.	111–119	116–130	125–142
5 ft. 6 in.	114–123	120–135	129–146
5 ft. 7 in.	118–127	124–139	133–150
5 ft. 8 in.	122–131	128–143	137–154
5 ft. 9 in.	126–135	132–147	141–158
5 ft. 10 in.	130–140	136–151	145–163
5 ft. 11 in.	134–144	140–155	149–168
6 ft.	138–148	144–159	153–173

*Derived from data of the 1959 Build and Blood Pressure Study, Society of Actuaries.

In presenting these new values for desirable weights, the *Statistical Bulletin* comments: "Obviously, no single value would apply to all persons of a specified height, inasmuch as individuals differ in such respects as chest width and depth, hip width, bone thickness, muscularity, and length of trunk relative to total height. In deriving the ranges for small, medium, and large frames, use was made of available anthropometric studies. As a rule of thumb, if persons of any particular build kept their weight down to the average in the early twenties, it would be fairly close to the desirable weight at ages over twenty-five.

"A notable feature of the revised table for women is an appreciable increase in the ranges of desirable weight, compared with those in the earlier table. The new study, as well as other sources, shows that the normal variability of weights for women is at least as great as that for men of corresponding height."

Sodium Content of Fish Flesh[1]

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EARLY REPORTS concerning the sodium content of foods (1), including fish, were misleading, since they were based on a small number of samples. The purpose of this report therefore is to present recent data for fish flesh that are based on a more adequate sampling and that take into account factors influencing the variation in sodium content.

Comparison of Sodium in Flesh Foods

Foods, to be acceptable for use in sodium-restricted diets, should contain considerably less than 100 mg. sodium per 100 gm. food, since some menus restrict the maximum daily intake to 200 mg. (2). The majority of flesh foods—including meat, poultry, fowl, fresh-water fish, and salt-water fish—have values well below this limit.

Published data reveal that the sodium content of raw meat and poultry (Table 1) is uniformly low and averages about the same for both types of flesh, the values being 53 and 55 mg. per 100 gm. respectively (2). Analyses were made on commercially prepared products. The values obtained are considerably lower than those given in earlier tables of "best estimates" (3, 4).

A previous report from this laboratory (5) gave the following averages for sodium in milligrams per 100 gm. (Table 2): (a) 58 for eight species of fresh-water fish; (b) 62 for ten species of Atlantic salt-water fish; and (c) 68 for eleven species of Pacific salt-water fish. The analyses were made on the raw flesh taken from the fish soon after capture. Some of the data are based on a small number of samples. To provide data based on a larger number and to include more species, chemists at our Seattle laboratory are making a comprehensive survey of West Coast fish.

Our present studies include rockfish, sole, halibut, tuna, and salmon, since these fish are the major species found in Pacific waters. Recent data obtained for the sodium content of these species are shown in Table 3. These values represent averages of a fairly large number of specimens. In several instances, the values are lower than those previously reported. These results demonstrate the importance of obtaining as wide a variety of samples as possible.

TABLE 1 Sodium content of raw meat and of raw flesh of poultry and game

TYPE OF FLESH	SODIUM	
	Estimated values 1954 (4)	Analyzed values 1958 (2)
	Meat	
	mg./100 gm.	*mg./100 gm.*
Beef		
Ground	65	55
Round	65	43
Sirloin	65	57
Veal		
Leg	50	44
Chops	50	60
Lamb		
Loin	98	61
Leg	78	61
Pork—loin	55	39
Average	66	53
	Poultry and Game	
Chicken		
Breast	75	41
Dark meat	75	45
Duck		
Breast	68	67
Leg	96	67
Rabbit		
Loin	34	36
Leg	47	55
Turkey		
Breast	40	61
Dark	92	70
Average	66	55

[1]Presented at the 42nd Annual Meeting of The American Dietetic Association in Los Angeles, on August 28, 1959.

TABLE 2 Sodium content of raw flesh of fresh-water fish and salt-water fish from the Atlantic and Pacific (5)

SPECIES	SODIUM
Fresh-Water Fish	
	mg./100 gm.
Carp	48
Yellow pike	50
Whitefish	51
Buffalo fish	55
Herring	56
Mullet	59
Sheepshead (river)	59
Yellow perch	69
Sheepshead (lake)	77
Average	58
Atlantic Salt-Water Fish	
Pollock	48
Mackerel	48
Flounder	56
Sea trout	59
Haddock	61
Porgy	63
Whiting	65
Sea bass	70
Red snapper	70
Mullet	81
Average	62
Pacific Salt-Water Fish	
Albacore	34
Halibut	53
Ling cod	62
Gray cod	76
Yellowtail rockfish	50
Red rockfish	66
Black rockfish	66
Orange rockfish	71
Ocean perch	79
English sole	91
Petrale sole	96
Average	68

The averages of 59 mg. per 100 gm. for rockfish and of 59 for sole, halibut, and tuna compare favorably with the average of 58 for fresh-water fish (Table 2). Researchers at the Seattle laboratory have not obtained sufficient data on sodium in salmon, but McBride and MacLeod at the Technological Station in Vancouver, British Columbia, have published data (6) on four West Coast species (Table 4). The average of 51 mg. per 100 gm. for this group is one of the lowest found for sodium in fish flesh and is second lowest only to tuna.

Data reported here reflect a wide variation in sodium content between the different species and also between fish of a single species. Other factors that influence the sodium content of fish flesh include sex (7, 8), size (6), and season of capture (6). The sodium content is larger in the male and in smaller specimens and the sodium content fluctuates with the season (Table 5). These variations, however,

TABLE 3 Sodium content of raw flesh of sole, halibut, tuna, and rockfish

SPECIES	SODIUM
	mg./100 gm.
Sand sole	56
English sole	72
Flathead sole	72
Petrale sole	72
Halibut	51
Skipjack tuna	41
Albacore tuna	45
Orange rockfish	46
Yellowtail rockfish	50
Chilipepper rockfish	55
Ocean perch	59
Red rockfish	66
Black rockfish	66
Greenstripe	68
Average	59

TABLE 4 Sodium content of raw flesh of different species of salmon (6)

SPECIES OF SALMON	SODIUM
	mg./100 gm.
Silver	51
Sockeye	47
Pink	56
Chum	50
Average	51

are not sufficiently large to prevent the use of fish flesh in sodium-restricted diets.

Effect of Handling on Sodium in Fish

The above data are for raw flesh before the fish has been processed. The dietitian is more concerned about the sodium content of the fish as it is eaten than in the amount it contained at any prior time. It therefore is important to consider the effect of handling methods on sodium content.

Fish is subject to three types of handling before reaching the patient: (a) on board the fishing vessel, (b) in the processing plant, and (c) during cooking. The effect on sodium content may be either positive or negative, depending on the loss or gain of moisture and the gain or loss of sodium.

Fish is ordinarily sold as fresh or frozen on the one hand, or preserved—such as canned, salted, or smoked—on the other. We are concerned primarily with fresh and frozen fish, since salt ordinarily is purposely added to the various preserved products, resulting in a relatively high sodium content that makes the effects of other methods of handling irrelevant.

Methods of handling on board fishing vessels vary greatly because of the difference in time the fish remain on board. This interval may range from overnight to more than a month. For short periods of a day, no refrigeration ordinarily is necessary. This method of holding involves both evaporation of

TABLE 5 Variations in sodium content of raw flesh of salmon and cod

VARIATION	SODIUM			
	Pink salmon	Silver salmon	Ling cod	King salmon
Sex (7, 8)				
Male				
Sample 1	82	—	—	—
Sample 2	75	—	—	—
Female				
Sample 1	65	—	—	—
Sample 2	66	—	—	—
Size (6)				
Small	—	51	55	—
Medium	—	40	52	—
Season (6)				
May	—	—	—	58
June	—	—	—	51
July	—	—	—	37
August	—	—	—	40

moisture and drainage of liquid, but the effect of these factors on sodium content is not extensive. For longer periods of storage, refrigeration must be provided. Icing is usually used to preserve fish on trips lasting one or two weeks. The fish are surrounded with crushed ice as they are placed in the hold. This method is common in the West Coast halibut industry, for example, since the fish may have to be transported for several hundred miles. Leaching of the liquid content of the fish materially reduces the sodium content when ice is used for refrigeration (Table 6). Brine-chilling, or storing the fish in a refrigerated, 3 per cent by weight sodium chloride solution, is being tried on a commercial scale in lieu of ice, but it is not yet employed to an appreciable extent. When fish are kept in such a solution, the flesh absorbs a large amount of sodium (Table 6).

Procedures employed in fresh-fish processing plants on the West Coast are not likely to produce more than minor changes in the sodium content. The treatments include trimming, washing, and cutting (if fillets or steaks are prepared). These steps could involve absorption or evaporation of moisture, which however would not materially change the sodium content.

Fish fillets and steaks to be frozen are usually dipped in water, in a preservative solution, or in dilute brine before packaging. In some instances, the fillets after freezing are dipped in water to provide a protective ice glaze. When only fresh water is used, there is little change in the sodium content of the flesh, but when brine or other solutions are used, the sodium content may be increased several fold. Examples of fish products with which brine solutions have been used are shown in Table 7. Since large quantities of fish are readily available that have not been treated by sodium-containing compounds, the high sodium values for the treated products do not preclude the use of fish flesh for sodium-restricted diets.

TABLE 6 Variations in sodium due to preservation

SPECIES	SODIUM			
	Dry frozen	Iced	Fresh	Brine chilled
	mg./100 gm.	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*
Halibut	58	51	—	—
Flathead sole	85	60	—	—
Pink salmon	—	—	59	520
Yellowfin tuna	—	—	37	439

TABLE 7 Sodium content of frozen fish fillets and steaks

SPECIES	SODIUM	
	Water dipped	Brine dipped
	mg./100 gm.	*mg./100 gm.*
Silver salmon	46	215
Chum salmon	56	—
Halibut	48	260
Ocean perch	48	—
Gray cod		
Sample 1	68	—
Sample 2	73	—
Dover sole		
Sample 1	69	—
Sample 2	76	167

In most canning processes, salt is added to suit the average taste. As a result, the sodium content is usually greatly increased, as is shown in Table 8 from the analyses of Murray and co-workers (9). However, the sodium content of the unseasoned canned product is also seen from the table to be essentially the same as is that of the raw flesh (compare with Tables 3 and 4). The fishing industry is cognizant of the need for a product low in sodium for those who are prescibed a diet that is restricted in sodium content. Accordingly, both the salmon and tuna industries, for example, produce special packs labelled "dietetic," which are low in sodium.

Cooking methods affect the amount of sodium in the serving portions. Thus, for a given size portion, the sodium will depend on the cooking method used. Unless sodium is added, any changes taking place would be caused largely by leaching out of sodium or by changes in the moisture content of the flesh, owing to the evaporation or absorption of moisture. Researchers at the Boston laboratory of the Bureau of Commercial Fisheries are investigating the effects of the method of cooking, and a report of this work is now being prepared for publication. The work of Dahl (2) indicates a large gain in the sodium content of cooked flesh, but no description is given regarding the method of cooking or the ingredients added. Preliminary work at the Seattle laboratory has indicated that baking does not significantly alter the sodium content.

TABLE 8 Sodium content of canned fish (9)

SPECIES	SODIUM	
	Unsalted	Salted
	mg./100 gm.	*mg./100 gm.*
Sockeye salmon	44	628
Chum salmon	48	—
Silver salmon	54	590
Albacore tuna	45	875

Conclusions

Although many factors contribute to variation in the sodium content of fish flesh, the values usually lie within acceptable limits. The one exception involves processes that actually add sodium to the product. However, since large quantities of all species of fish are readily available that have not had sodium added, fish is available which can be used in sodium-restricted diets to provide interest and variety.

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Pork Preferences

People like "marbled" pork better, but they tend to buy lean pork, according to a report from R. G. Kauffman, R. W. Bray, and M. A. Schaars of the Wisconsin Agricultural Experiment Station. These researchers observed the purchases of more than 200 people at a Madison meat counter. Similar lean and marbled center cut rib chops were displayed, and the customers did not know they were being observed.

When both types of chops sold at the same price, 71 per cent selected the lean chops, although more people bought marbled chops when the price was as much as 6 cents (8 per cent) less. At 12 cents less, 75 per cent bought the marbled chops. When the marbled chops were 4 cents higher than the lean, almost 90 per cent bought the lean chops.

At the last observation session, the customers were given, in addition to their purchases, two chops of the kind which they had not selected. The researchers later called the customers to learn which they had preferred on eating. Almost 62 per cent definitely preferred the marbled chops, and only 18 said they liked the lean chops better. The main reasons for the preference for marbled chops were: tenderness, flavor, and juiciness. Almost 90 per cent said they would be willing to pay more for them, but—as their purchases revealed—they did not actually do so.

Marbling is not at present considered in grading and pricing pork, although indications are that well marbled pork is higher quality pork and should thus be graded higher than comparable cuts which are not marbled.

However, since consumers buy lean, unmarbled cuts, an educational program to improve consumer knowledge will likely be necessary before marbling can be considered seriously in grading. This survey showed that less than half the customers knew what marbling was or thought it important.

Also, to make marbling practical as a pork grading or carcass pricing consideration, some method must be found to estimate the degree of marbling on the basis of other characteristics. Thus far, researchers have not found any one measurement—as with the loin eye between the twelfth and thirteen ribs in beef carcasses—which will give reliable prediction of marbling in pork without slicing into the carcass. It is possible, however, to predict ham marbling from measurement of loin marbling.—*From What's New in Farm Science, Annual Report Part Two, University of Wisconsin Agricultural Experiment Station, Bull. 538, Fall 1959.*

A Public Health Study in California

Sodium in Special-Purpose Foods and in Water[1]

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KNOWLEDGE OF THE sodium content of food and water is important in planning therapeutic diets in cases of congestive heart failure, cirrhosis of the liver, hypertensive disease, certain diseases of the kidneys and the toxemias of pregnancy. Dietitians use this knowledge, first in the hospital in the preparation and service of the patients' diets, and second in planning the patients' dietary regimens to be followed away from the hospital.

The patient on a sodium-restricted diet is told to read the label for the sodium content of a product and to find out what the sodium value of the drinking water is. We assume that label information is correct and that sodium values for drinking water are readily available. This may not be the case. Labels may be inadequate or even inaccurate, and information on the sodium content of drinking water simply may not be available.

Because of this need for information on sodium, the California Department of Public Health carried out two investigations—one a food study, the other a water survey.

In describing these surveys, I will identify the groups most directly involved, relate how the survey developed, give a short review of the procedures, and outline our future plans. I will conclude with some comments as to how we, as dietitians, might stimulate such activities.

Food Survey

Prior to our study, federal regulations existed which required that labels on all products sold as special-purpose low-sodium foods must indicate the quantity of sodium both in milligrams sodium per 100 gm. food and milligrams sodium per average serving. However, federal regulations apply only to products in interstate commerce and California had no regulation for specialty low-sodium foods produced and sold within the state. Nevertheless, the federal regulations played an important role in the Los Angeles Heart Association's "approval program" which had an early influence in the development of our food survey.

The Los Angeles Heart Association granted a "seal of approval" to any product which met the federal requirements. To be eligible for this endorsement, a food company selling a special-purpose low-sodium food in the Los Angeles area had to submit samples of its products quarterly (at its own expense) to an approved laboratory for sodium analyses. The results were sent directly to the Heart Association for evaluation. If granted the "seal of approval," the product's name was then added to the approved list which was made available to medical personnel as well as to other interested persons. This program existed on a voluntary, not a legal, basis, and was limited to the Los Angeles area. The demonstrated benefits of such a program on a local basis prompted the Special Diet Committee of the California Heart Association to request the California Department of Public Health to conduct a survey of special-purpose low-sodium foods throughout the state.

When our program started, the Special Diet Committee was composed mainly of physicians from various areas in the state, a dietitian representing the California Dietetic Association, and a public health nutrition consultant who served in a liaison capacity between the two agencies. The Committee's request was made in May 1956, at which time the state Department of Public Health was taking an initial step in formally adopting the federal regula-

[1]This article is based on a cooperative study done by the Bureau of Food and Drug Inspections, Bureau of Sanitary Engineering, Bureau of Records and Statistics, Sanitation Laboratory, Food and Drug Laboratory, and Bureau of Nutrition of the California Department of Public Health. Presented at the 42nd Annual Meeting of The American Dietetic Association in Los Angeles, on August 27, 1959.

tion. This action was completed late in 1956; then, with a legal basis for corrective measures which could be made mandatory whenever necessary, our food survey began.

SAMPLES ARE ANALYZED

The Bureau of Food and Drug Inspections within the Department of Public Health organized a plan whereby their field inspectors collected samples of special-purpose low-sodium foods and submitted them to the Food and Drug Laboratory for sodium analysis. The testing was performed by a flame photometric method.

To date, approximately 250 products have been analyzed. A total of 25 per cent were found to be in violation of the regulation concerning labeling. Of these, 7 per cent had substantially more sodium than declared on the label; 4 per cent had substantially less; and the remaining 14 per cent either did not declare the sodium content at all or did not declare it in the terms required.

VIOLATORS ARE EDUCATED

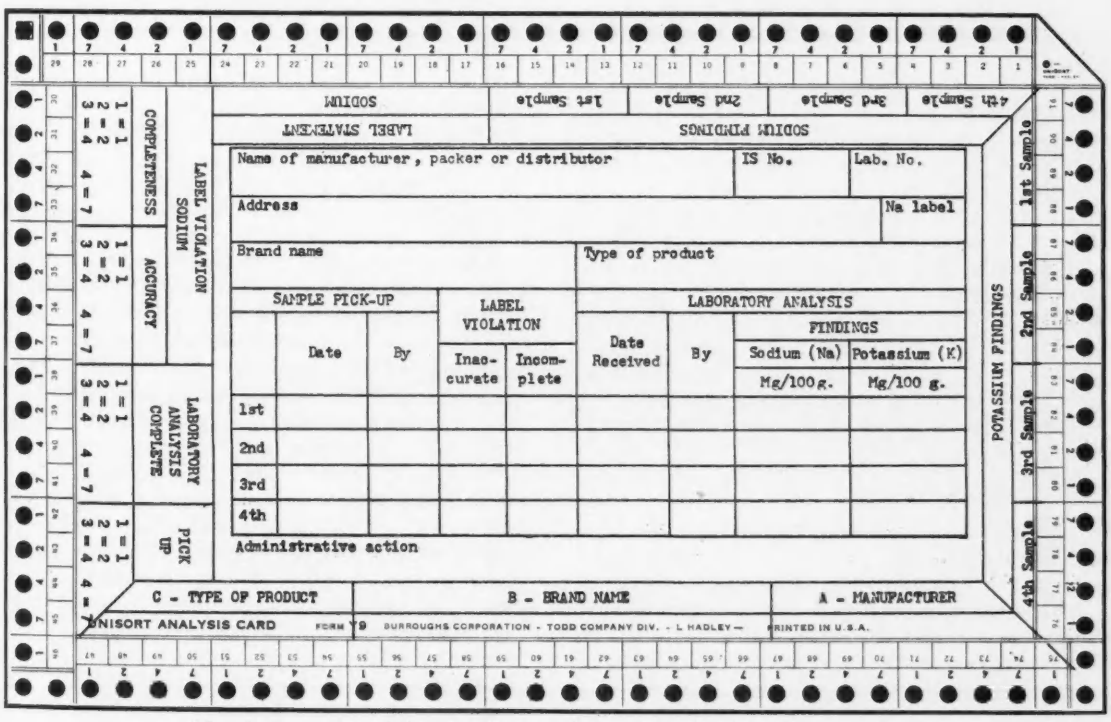
The Department of Public Health has acted on all known violations. Action involves an administrative hearing with the chief aim being not to prosecute the violators, but rather to interpret to them the importance of accurate labeling. To date, all hearings have resulted in satisfactory corrective action. However, if an agreement were not reached, the case would be referred to the district attorney having jurisdiction.

We feel that this activity has resulted in several benefits. There is better communication with the food manufacturers. They have shown an increased awareness of the importance of accurate labeling, and some have come to us for suggestions regarding the possibility of standardized labeling for low-sodium foods. The most important benefit, however, is that a greater reliance can now be placed on statements on labels regarding sodium content.

The Department of Public Health plans continued surveillance of low-sodium products. The Bureau of Food and Drug Inspections will collect samples semi-annually with special emphasis on (a) products which in the past were in violation; (b) products which have been reported as questionable; and (c) all new products.

Our future plans also involve the use of a marginal punch card (illustrated).

We developed this marginal punch card to record information on all products tested. It will accommodate the anticipated volume and give us a continuing record, by product, of samples taken, the results of analyses, and any subsequent action. Eventually the volume of records may increase to the point where a change to mechanized methods will be necessary.



Marginal punch card for recording all data concerning low-sodium products

This card also lists the potassium values of these foods. We decided to include this determination in the analyses, anticipating a possible future need for such information, even though it is not at the present time required on the label.

In the future also, the California Heart Association plans to cooperate with the Department of Public Health in this continuing activity in whatever way possible and specifically by providing information semi-annually on new low-sodium products being sold throughout the state.

Water Survey

Prior to our program, only limited information was available on the sodium values of domestic water supplies in California. In line with their interest in low-sodium dietary control, the same Special Diet Committee of the California Heart Association recognized the need for more complete information and requested the Department of Public Health to compile such data. Needless to say, the Department of Public Health is primarily concerned with the bacteriologic content of water; however, appreciating the need for sodium values, it agreed to do the determinations, and our survey started late in 1957.

At the onset, we realized that it would not only be impractical but in reality impossible with the time and manpower available, to determine the sodium content of all of the thousands of water sources in the state. To decide which systems would be included in our survey, we considered the population served by systems in various size categories. We found that a large majority of the state's population—75 to 80 per cent—receive water from approximately 340 systems, with each system serving 1000 or more households. There are approximately 400 intermediate size systems, each serving between 200 and 1000 households and delivering water to only 10 to 20 per cent of the population. The third category (those systems which each serve less than 200 households) covers only 5 to 10 per cent of the population and numbers in the thousands. Economy prompted us to compile data for only the 340 larger systems. With these data, we will make available in our first published tabulation, information on the sodium values of water being used by 75 per cent or more of the state's population.

SOURCES OF SAMPLES

The Bureau of Sanitary Engineering arranged to collect the water samples. These were "grab" samples taken as convenient from one or more but not necessarily from all sources within each system. These "grab" samples could provide a value which could be used indefinitely if the sodium content of each source would remain constant. However, factors, such as the amount of rainfall and other weather conditions, may result in significant variations from time to time within the individual source.

In addition, it should be realized that some variations within a system may result from its multiple sources. Our work would have been simplified if all water distribution systems "pooled" and mixed the supplies from all sources. However, this is not the usual practice. Instead, the sources are fed into the system at different points resulting in a water supply having varying amounts of sodium at different points throughout the system. These variations must be considered in interpreting the data.

All samples collected were analyzed for sodium values in the Sanitation Laboratory by the flame photometric method. Additional values were made available in a few instances by the very large water companies who routinely do chemical analyses of their water.

In arranging for sampling, we anticipated that some local water suppliers might be concerned that our results would be used to try to influence them to change their system's sodium content. We considered it important to assure them that the results would be used only as a guide for those concerned with sodium content. As part of our discussion with these individuals, we emphasized that it was not a question of sodium causing heart disease or other illnesses but simply an effort to measure and, thereby, control one of the factors which may be important in the management of certain conditions.

RESULTS OF ANALYSES

Our survey yielded ranges of values, due to the several sources sampled within each system. The highest and lowest values determined for each system are shown in our final tabulation. Where a single value appears for a system, this merely indicates that only one source within the system was sampled. The other sources could and probably would introduce some sodium variations.

Our results are summarized in a tabulation of sodium content arranged alphabetically by county and broken down by community and system.

We found a wide range of sodium content in these water systems. In some areas, 1 qt. water alone could supply more than the daily allowable intake in a 200-mg. sodium diet; in other areas, the amount was inconsequential. There appears to be no correlation in California between the sodium content of surface vs. ground water, but there are significant differences in the sodium values among areas within the state. These differences may be related to the climate and/or the geologic characteristics of the area.

Another factor in these differences may be the importing, in some instances, of water low in sodium from distant regions into an area of highly mineralized water or vice versa.

One additional consideration is the softening of water. Most home softeners replace "hard" minerals with sodium, thus materially increasing the sodium content. Community water softening, done at the treatment plant, may or may not appreciably increase the sodium content, depending on the process used. Our tabulation includes the effects of community water softening but, of course, does not show the effects of home water softening. A word of caution is in order for those individuals on a sodium-restricted diet who use a home water softener.

In compiling and using such information, it is important to consider it only as a guide. With the number of sources within a system often changing and the sodium content of each source varying, it is impossible to know accurately the amount of sodium on a current basis. The most important value of such a compilation is that it gives a range for sodium content of waters in a particular area. In some instances critical cases may still demand individual measurement of sodium content.

Now that we have this information, we plan, in cooperation with the California Heart Association, to make it available to physicians, dietitians, and others. The compilation is now available from the California Heart Association and the Bureau of Nutrition, California Department of Public Health.

As our communities continue to expand their water systems in line with our rapid population growth, this information will need to be revised periodically so that it will continue to be reasonably accurate and reliable.

Suggestions to Dietitians

This study demonstrates what can be accomplished by the cooperative effort of voluntary and official agencies. In reality, it demonstrates the work of the "community health team," because certainly all who were involved were concerned with the health of the community.

We, as dietitians or nutritionists, can play valuable roles as members of the community health team. There are several ways to enlist the voluntary and official agencies' support and cooperation in recognizing and presenting the need for such programs. For example, as a member of the hospital dietary advisory committee, you might stimulate committee action in soliciting support and cooperation of outside agencies in programs such as those described here. Or, you can work through your local and state dietetic associations' representatives, who may serve on an action committee similar to the Special Diet Committee described earlier.

In many cases, you may find that your problem is shared by others, and your combined efforts can mobilize action of other members of the community health team. Your own efforts may be multiplied many times over by stimulation of such concerted action, resulting in considerable benefits for the public and personal satisfaction for you as well.

Teaching Nutrition at Snack Time

Cakes, cookies, and peanut butter and jelly sandwiches for snacks were often brought to school by pupils of the Mt. Diablo Unified School District, Concord, California, according to Mary Centrell, public health nurse. She, therefore, developed a plan to promote better nutritional habits with kindergarten children at their mid-morning snack time, at which milk is usually served.

A meeting was held with the parents explaining the importance of children having "health snacks," rather than sweets, and their cooperation was obtained so that each day, one pupil brought, by pre-arrangement, the "treat." Treats consisted of carrot or celery strips, apple or orange wedges, dried prunes, raisins, dried apricots, peaches, or fresh fruits in season. Such health snacks serve a twofold purpose: they do not curb the children's appetites for their next meal and they help keep their sweets at a minimum, thereby helping to prevent dental caries.

When the children are finished with their snacks, they are urged to get a drink of water and "swish and swallow" so that most of the food is removed from their mouths. In this way, they begin to realize that good nutrition and good dental health can go together. Once these habits become routine, the children are less likely to bring sweets to school for snacks.

In the high schools of this system, "health snack" machines that dispense apples, oranges, peanuts, orange and other fruit juices have been installed.

This type of program is recommended for a P.T.A. project, in which parents, teachers, administrators, and school nurses can cooperate.

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Recent Research in the B Vitamins[1]

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MORE THAN A decade has passed since the isolation of vitamin B_{12} was announced independently by two laboratories (1, 2). It appears unlikely that major growth factors for higher animals, including man, remain undiscovered. Interest has shifted to the action of nutrients and their interrelationships.

Nutritionists move with the times as evidenced by recent articles in *Nutrition Reviews* (3) on "Nutrition in the Space Age" and on "Space Nutrition" (4) in this JOURNAL. Five lb. green algae will supply the nutritional needs of the traveler, who is 120 mi. in space. The growing algae will also furnish his oxygen and remove his carbon dioxide.

A revived line of investigation concerns the biosynthesis of B-vitamins as influenced by the source of carbohydrate in the diet. As early as 1938, Morgan and co-workers (6) reported that the requirements of the rat for riboflavin and vitamin B_6 were reduced when lactose was included in the diet and that cornstarch had a like effect in sparing pantothenic acid. Those authors concluded: "Sucrose neither carries nor produces any of the vitamin B_2 factors and is therefore the carbohydrate of choice for the study of these factors." Morgan and Yudkin (6) have recently reported that rats could be maintained on a diet deficient in thiamine for long periods of time when 10 or 20 per cent sorbitol was included in the diet. This work was extended by Jones and Baumann (7), who found that penicillin, sorbitol, or both in combination consistently increased the growth and survival of thiamine-deficient rats. This was particularly true when the need for thiamine was reduced by the feeding of high-fat diets. It is interesting that the ingestion of sorbose affected a 50 per cent increase in the size of the caecum in rats and in mice. When access to the feces was prevented, the "sparing action" was not observed. Sulfa drugs are said to prevent this biosynthesis.

[1]Presented at the 42nd Annual Meeting of The American Dietetic Association in Los Angeles, on August 28, 1959.

Vitamin B_{12}

Rice and co-workers (8) have found that sorbitol enhances the absorption of vitamin B_{12} in rats. Chow (9, 10) has recently reported that a lipotropic elixir containing sorbitol increased the oral utilization of vitamin B_{12} in man. Ellenbogen and co-workers (11) were unable to find any evidence that sorbitol effected greater absorption of vitamin B_{12} in patients with pernicious anemia. Thus it appears that sorbitol facilitates the absorption of vitamin B_{12} in rats and normal human subjects, but that is without effect in helping patients with pernicious anemia.

Grasbeck and associates (12) have suggested that the defective absorption of vitamin B_{12} in patients with steatorrhea may be due, at least in part, to a calcium deficiency. In sprue, calcium is excreted in the form of insoluble soaps. When adults with ideopathic steatorrhea and children with celiac disease were given calcium lactate and cobalt^{60}-labeled vitamin B_{12}, the urinary excretion of the tagged vitamin B_{12} was increased. In some cases, the differences were small. Calcium lactate did not affect the absorption of vitamin B_{12} in patients with pernicious anemia.

Impaired utilization of vitamin B_{12}, as evidenced by lowered blood levels, has been reported with advancing age (13, 14). However, as has been pointed out by Killander (15), the spread in values is great. His subjects varied in age from one month to eighty-two years. Levels were lower for females than for males of each age group, but there was little difference in the serum vitamin B_{12} levels between younger and older individuals. Draper and Lowe (16) reported that young rats absorbed less vitamin B_{12} than adult rats; the poorer utilization, however, was more than compensated for by the increased food intake per unit of body weight. In very old animals, the food consumption was reduced and the vitamin absorption slowly decreased with a resulting fall in the serum levels.

The excretion of vitamin B_{12} has been studied in

carriers of the fish tape worm, *Diphyllobothrium latum* (17). Subjects both with and without megaloblastic anemia, showed a decreased excretion of cobalt^{60}- labeled vitamin B_{12} in the Schilling test. All seven carriers with megaloblastic anemia had excretion values which were in the range for patients with pernicious anemia. Only nine out of fifty non-anemic worm carriers had serum levels of vitamin B_{12} which were within the normal range. After expulsion of the worm, three of the non-anemic and three of the anemic carriers had excretion values within the pernicious anemia range.

Augmenting the fat content of the diet increased the severity of vitamin B_{12} deficiency in the chick (19). This effect of high dietary fat was not observed in the presence of supplemental methionine. However, both vitamin B_{12} and methionine were necessary for maximum growth. Vitamin B_{12} appeared to ameliorate some of the manifestations of toxic intakes of methionine on fat-free diets.

Other Deficiencies

An uncomplicated deficiency of a single member of the B-complex (excepting vitamin B_{12} and folic acid) is rare. Pyridoxine deficiency has seldom been seen under natural conditions. Some of the cases that have been reported were induced by the administration of the antagonist desoxypyridoxine. Two cases of anemia were recently reported from Nairobi, Kenya (20). One responded to pyridoxine and the other to niacin.

Morrison and Sarett (20) have found no evidence of a sparing effect of high levels of one vitamin on the requirements for another. An excess of one vitamin did not prevent the severity of deficiency signs of another. High levels of thiamine were without effect on the weight gain and food efficiency of rats fed diets deficient in pyridoxine, pantothenate, or riboflavin. Similarly high intakes of pyridoxine, pantothenate, or riboflavin did not influence the severity of thiamine deficiency.

Niacin and Serum Cholesterol

Altschul and co-workers (21) reported in 1955 that nicotinic acid (but not nicotinamide), when administered in high doses, lowered serum cholesterol in normal subjects. Their findings have been confirmed repeatedly. Parsons and co-workers (22) found that 1 gm. nicotinic acid, three times daily produced a significant decrease in serum cholesterol and in beta-lipoproteins in normal and atherosclerotic subjects. Side effects (vasodilation and pruritus) disappeared at the end of the first week when the niacin was taken with the food. Discontinuance of therapy resulted in a return to pretreatment values. Achor *et al.* (23) have observed that individuals with higher initial values showed a greater response than did those with normal serum cholesterols. In general, the differences were more marked with women than men.

Gurian and Adlersberg (24) reported that the serum cholesterol generally decreased more than the serum phospholipids. The fall in total lipids and of serum triglycerides was quantitatively similar to that of serum cholesterol. Niacin consistently and significantly diminished carbohydrate tolerance in non-diabetetic subjects but was without effect in the adult-onset type of diabetes. The mode of action of niacin in reducing serum cholesterol and its significance in coronary heart disease are unknown. The effect could be described as pharmacologic rather than nutritional on the basis of the high dosage required and the fact that nicotinamide is ineffective.

Other Diseases

The report of Rinehart and Greensberg (25) that arteriosclerosis could be induced in Rhesus *(Macaca mulatta)* monkeys by feeding a vitamin B_6-deficient diet has stimulated research in this field. Witten and Holman (26) some years ago suggested that vitamin B_6 was essential for the conversion of linoleic to arachidonic acid. Perkins (27) failed to find a significant decrease in serum cholesterol when a safflower oil-pyridoxine emulsion was administered to young adult males who were consuming a normal diet containing moderately high amounts of saturated fats. When a low-fat diet was used, the addition of 45 gm. corn oil or safflower oil produced a greater decrease in the cholesterol level than the low-fat diet alone. A slight, but not statistically significant, downward trend was noted when pyridoxine was added. This study re-emphasizes the fact that unsaturated fats should be used only when combined with a diet which limits the use of saturated fats.

Isonicotinic acid hydrazide (INH) has been used successfully in treating tuberculosis. The structural relationship of INH to niacin and to pyridoxine suggested that it might act as an antimetabolite against niacin, pyridoxine, or both. Biehl and Vilter (28) reported that 40 per cent of the patients receiving 20 mg. INH per kilogram developed neuritis. The administration of 50 mg. pyridoxine daily provided an effective prophylaxis.

Xanthurenic acid excretion after a tryptophan load test increased in INH-treated subjects. Boone *et al.* (29) reported that toxic effects of INH were more severe in vitamin B_6-deficient than in normal animals. Rosen (30) confirmed this finding. INH appeared to have no bearing on niacin metabolism in rats.

A provocative paper by Gershoff and associates (31) appeared recently. The excretion of oxalic acid by both mongoloid and non-mongoloid mentally retarded patients was markedly reduced by pyri-

doxine administration, although the subjects had been receiving a diet apparently adequate in vitamin B_6. The authors suggest that the evaluation of urinary oxalate excretion may possibly serve as a functional test for adequacy in vitamin B_6 and for its value in treating diseases associated with oxalate deposition or oxaluria, particularly oxalosis and various types of kidney disease.

Summary

A few papers have been reviewed that may be of interest to the nutritionist and dietitian. The biochemist has a challenge in unraveling the complexities of the interrelationship of nutrients.

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Defrosting Frozen Ground Beef by Forced Convection[1]

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QUICK FREEZING of meat is accomplished by several methods. Products can be frozen by direct immersion in a refrigerating medium, by indirect contact with a refrigerant, by placing the product on a metal surface cooled by refrigerating media, and also by freezing in a blast of cold air. By rapidly circulating the air, the process of air-freezing has been improved and brought out of the slow-freezing class and into the quick-freezing class. Air-blast or forced-convection freezing is probably the most common method used today (1). However, little work has been done on the use of forced convection for defrosting meat.

This study has been carried out in an effort to investigate the defrosting of meat by forced convection and to determine the rate of defrosting of ground beef at varying air velocities and temperaperatures. The objectives were threefold: (a) to determine the effect of different air velocities at constant temperatures on the rate of defrosting ground beef; (b) to determine the effect of varying air temperatures at a constant air velocity on the rate of defrosting ground beef; and (c) to determine an optimum air velocity, within the air velocities studied.

Procedure

The scope of the study was limited to fourteen defrosting tests and at least two replications of each test. The specimens used for defrosting were 1-lb. portions of ground beef. The samples were defrosted in still air and six air velocities from 100 to 600 ft. per minute by 100-ft.-per-minute increments. The air temperatures studied were 72°F. and 82°F.

These terms were used as follows throughout this study:

Defrost: to raise the temperature above the frozen point. In this work, the word "defrost" was used to denote a change of temperature in the meat specimen from +2.0°F. to +34.0°F.

Rate of defrost: the temperature change per unit of time having the dimensions of degrees Fahrenheit per minute.

Still air: a condition surrounding the specimen where the air currents occur by natural convection and are not due to forced convection.

Ground beef was used as a test media because it was inexpensive, it is readily available, it was possible to get a uniform specimen, and it is a product that is widely used. Also, ground beef is usually defrosted completely before cooking because it frequently contains other ingredients. The meat must be completely defrosted so that a uniform mixture with the other ingredients may be obtained. Defrosting at temperatures above 150°F. would probably cook the surface before the center of the meat became pliable enough to mix with the other ingredients. Therefore, a rapid method of defrosting at relatively low temperatures is desirable.

The rate of defrosting was assumed to be influenced by eight variables: (a) composition of the specimen; (b) size and shape of the specimen; (c) temperature of the air around the specimen; (d) velocity of the air past the specimen; (e) amount of surface dehydration of the specimen; (f) relative humidity in the air surrounding the specimen; (g) initial temperature of the specimen; and (h) final defrosted temperature of the specimen.

THE SPECIMENS

Beef with a high percentage of water and a low percentage of fat requires more time to freeze than beef with a lower percentage of water and a higher percentage of fat (2). To obviate the possibility of different specimens having different defrosting times due to different compositions, ground sirloin butt having a uniform composition of 60.6 per cent moisture, 13.8 per cent fat, and 25.6 per cent muscle fiber and connective tissue was used.

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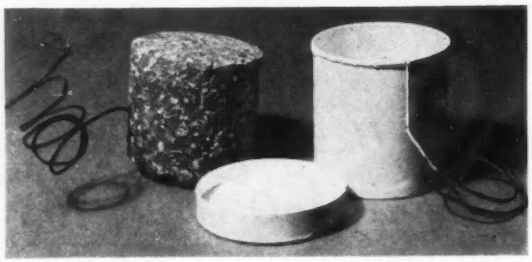

FIG. 1. *Meat specimen with container and cover.*

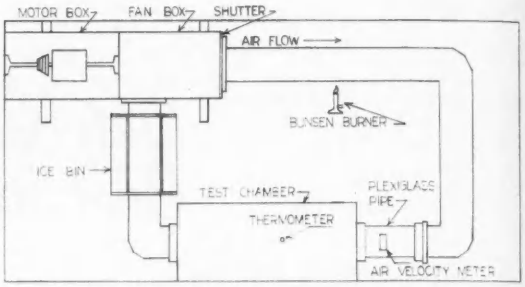

FIG. 2. *Diagram of wind tunnel.*

Too small a specimen would lead to short defrosting time which might cause errors in measuring time. If the specimens were large, an unnecessarily long time would be required to obtain data. Preliminary experiments indicated that a size that met the above requirements satisfactorily was a cylinder approximately 3½ in. long by 3½ in. in diameter. Figure 1 shows the 1-pt., cylindrical fiber ice cream container with approximately these dimensions in which the ground beef specimens were molded. Each container held 1 lb. of ground beef.

PHYSICAL CONDITIONS AND VARIABLES

If air temperatures were not held constant, the change in rate of defrosting would not be due to a change in the air velocity alone. In this study, temperatures were controlled to 72° ± ½°F. and 82° ± ½°F.

A basic engineering principle states that the main resistance to heat transfer by convection is found in a relatively stagnant laminar layer and an adjacent turbulent zone at the fluid solid interface. As the velocity of the heating fluid is increased, the more the laminar layer is dispersed. As the laminar or insulating layer of air becomes reduced in thickness, the temperature difference between the specimen and the main body of heating fluid becomes greater (3). This greater difference in temperature between the two substances provides for a greater rate of heat transfer as explained by Newton's law of cooling and heating (4).

Preliminary tests using still air, and tests at 100, 300, 500, 700, and 900 ft. per minute were made to determine the air velocities at which to work. Although air velocities above 600 ft. per minute continued to produce an increase in rate of defrosting, the increase became less with each increment in air velocity. Therefore, the study was limited to air velocities between still air and 600 ft. per minute, since this was the range where the greatest difference in defrosting time took place.

The dry muscle fibers on the surface of a sample form an insulating layer and impede the transfer of heat from the air to the interior of the meat specimen. The procurement schedule for the meat was

TABLE I **Rates of defrosting at various air velocities in air temperatures of 72° and 80° F.**

AIR VELOCITY	RATES OF DEFROSTING					
	Test	Replication 1	Replication 2	Replication 3	Replication 4	Average
			72° F.			
ft./min.						
Still air	0.1103	0.1171	0.1168	0.1140	—	0.1146
100	0.1242	0.1353	0.1250	0.1502	0.1495	0.1356
200	0.1530	0.1438	0.1538	0.1538	—	0.1511
300	0.1620	0.1711	0.1693	0.1553	—	0.1644
400	0.1675	0.1735	0.1688	0.1758	—	0.1714
500	0.1675	0.1720	0.1775	—	—	0.1723
600	0.1680	0.1839	0.1833	0.1798	—	0.1787
			80° F.			
Still air	0.1553	0.1544	0.1600	0.1623	—	0.1580
100	0.1793	0.1647	0.1802	—	—	0.1747
200	0.1910	0.1945	0.1802	—	—	0.1852
300	0.1882	0.1930	0.1863	—	—	0.1892
400*	0.2025	0.2006	0.2119	0.2077	0.1772	0.1980
500	0.2140	0.1981	0.1855	—	—	0.1993
600	0.2077	0.2031	0.1981	—	—	0.2029

*At 400 ft. per minute two additional replications were made with the following results: replication 5, 0.1910; replication 6, 0.1954. Average figure represents all six replications.

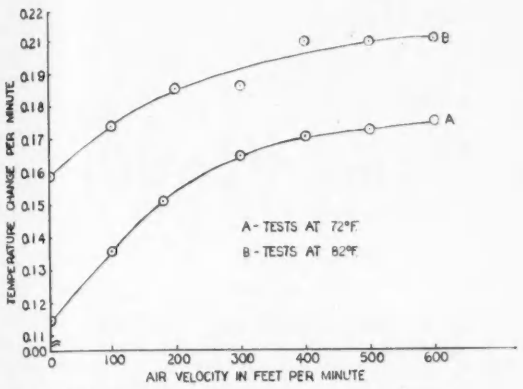

FIG. 3. *Rates of defrosting.*

arranged so that it would not remain in frozen storage more than twenty days and thereby reduce surface dehydration because of a long storage period. The fiber containers were plastic lined and formed a more airproof container than plain cardboard, which also helped reduce surface dehydration.

It was suspected that relative humidity would affect the rate of defrosting. An attempt was made to control the relative humidity of the air by placing an open vessel water in the test chamber. This procedure was only partially successful. The relative humidity varied between 18 and 100 per cent.

The meat specimens were kept in a freezer at −3°F. Timing of the defrosting period was started when the center temperature of the sample reached +2°F. The specimens in all tests were timed until the center reached +34°F. This temperature gave a margin of 6° above the 28°F. where meat is normally considered defrosted.

Thermocouples were accurately placed in the geometric center of the specimens by using a template during the molding of the specimens.

THE TUNNEL OR DEFROSTING CHAMBER

Figure 2 shows the wind tunnel designed to provide independently controlled air temperatures and air velocities. The system consisted of a blower, shutter, defrosting chamber, air velocity meter, and air heating and cooling devices, assembled into a closed wind tunnel arrangement.

Before making a test, the proper air temperature and air velocity were established in the defrosting chamber. A ground beef specimen was then placed on a cheesecloth sling in the defrosting chamber and the thermocouple imbedded in the specimen was connected to a recording potentiometer. The defrosting time was the time necessary for the temperature at the center to change from +2.0°F. to +34.0°F., a temperature differential of 32°F.

Results and Discussion

The results of all defrosting tests at 72°F. and at 82°F. are shown in Table 1, and the rates of defrosting are also presented graphically in Figure 3. The two curves on the graph show clearly the increase in the rate of defrosting with increasing air velocity.

The relative humidity in the test chamber was indicated by a hygrometer. The relative humidity was recorded and a rank correlation run by the Spearman coefficient of correlation (5). There was a positive correlation at both defrosting temperatures. At 72°F., the correlation was 0.178, and at 82°F., it was 0.429.

It appears from these two positive correlations, even though slight, that meat might tend to defrost faster at higher relative humidities.

Conclusions

The first hypothesis, that forced convection does increase the rate of defrosting frozen ground beef, was found to be true.

The second hypothesis, that higher temperatures surrounding the meat increase the rate of defrosting, was also found to be true.

The third problem was to determine an optimum air velocity within the air velocities studied. By observation, the optimum air velocity appears to be in the order of 300 ft. per minute.

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Butter Eaters of the World

New Zealanders eat more butter per person than any other people in the world—an average of 43.3 lb. per capita yearly. In contrast, the United States ranks thirteenth, with a yearly per capita consumption of 8.6 lb. Next to New Zealand, comes Ireland with 42.6 lb., followed by Australia with 28.3, Belgium 22.1, and Canada, 20.2. Italy, with 3.5 lb., is fifteenth. Six of the fifteen leading butter using countries have shown a postwar gain in butter consumption, eight have dropped, and one—Switzerland—has remained the same. These statistics come from the USDA's Foreign Agricultural Service.

The U.S. Army Veterinary Corps—From Early Military History to the Space Age

Food and Health

J. R. BRYANT[1]

THIS IS A story of progress. It is a story of how a specialized field of medicine has developed over the years—how a nation recognized the military potential of veterinary medicine and saw fit to create a separate corps of veterinarians.

The transition in the military veterinarian's duties has been influenced, like many other things, by the atomic age. No longer is he primarily concerned with ailing transport animals, improperly fitted horseshoes, or large hypodermic needles. Today, the radio-isotope takes its place alongside the microscope in the laboratory of the military veterinarian. Such terms as "strontium 90," "fallout," and "radio-assay" are as familiar to him as "liniment," "thermometer," and "sling" were formerly. His language is the language of the mathematician, the chemist, and the physicist. He is developing greater skills in microbiology and all of the other basic sciences of medicine. Food inspection and various types of research highlight the duties of today's military veterinarian.

To tell the story, accurately, of the United States Army Veterinary Corps—its gradual development and present operation—in peace and in war, it must be viewed from the standpoint of an integrated whole. It cannot be examined separately—all parts must be considered.

Revolutionary War Diets

The early military history of this country is replete with stories of the struggles to obtain proper food for the soldiers. The combination of inadequate diets and contaminated foods materially reduced the effectiveness of our early fighting forces.

During the Revolutionary War—with transportation very limited, mechanical refrigeration still to be invented, and military posts often isolated—the food issued to the soldier was seldom of the fresh wholesome quality the American soldier knows today. According to Rifkind (1), the diet of the Revolutionary War soldier was extremely simple and, most certainly, not well balanced. His ration, set by Congress in November 1775, included:

3 pts. of peas or beans per week or vegetables equivalent
1 pt. of milk per man per day
1 lb. beef or ¾ lb. pork or
1 lb. salt fish per day
1 lb. rice bread or flour, per day
rice
Indian meal
spruce beer or cider, molasses, candles, and soft or hard soap . . .

On 24 December 1775, the ration established by Congressional resolution was modified somewhat by a general order . . . Corned beef and pork were recommended for 4 days of the week, salt fish for 1 day and "fresh beef" for the remaining 2 days. Since milk was not available during winter season, men were to have 1½ lbs. of beef or 18 oz. pork . . . other perishables added were: 6 oz. butter (or 9 oz. lard) per week and onions, potatoes, and turnips as the "vegetables equivalent" of the 3 pints of peas or beans per week, per man, specified in the earlier resolution.

These rations were often cooked out of doors by the soldiers who huddled in small groups around a campfire.

During the Revolutionary War and subsequent military engagements up to World War I, procurement of food for the military was haphazard, and centralized military food purchasing and inspection were nonexistent.

Veterinarians Inspect Army Food

The food served the American soldier during the Spanish-American War became a grave issue because of the many deaths charged to what was popularly called "embalmed beef." As a result of this tragedy, veterinarians have been employed by the Army since 1901 to inspect its food so that there may not be a recurrence of a similar incident. These early Army veterinarians had little status, however; they were not commissioned officers. Therefore, much of their work, though performed with a modest degree of effectiveness, was done in isolation with half-hearted approval by their superiors.

By the time of World War I, there was an obvious need for an Army Veterinary Service to facilitate inspection of the huge amounts of food purchased by the military, and the United States Army

[1]The author is a civilian employee in the Office of the Surgeon General, Department of the Army, Washington, D. C.

Veterinary Corps was established by an act of Congress on June 3, 1916. The Corps is now an integral part of the Army Medical Service under the direction of The Surgeon General of the Army, who is charged with the responsibility of safeguarding the health of the troops.

The Veterinary Corps' Responsibilities

Today, meat, poultry, waterfoods, and dairy products comprise a great part of the soldier's ration and over-all Army food cost. It is with these foods that the Army veterinarian is concerned. Veterinarians inspect an animal before and after slaughter to determine its fitness for food. The military veterinarian's special education and training in the cause, recognition, effect, and control of food-borne diseases qualifies him to examine the organs of an animal or fowl to detect the presence and identify any disease found. The Army now combines the professional knowledge and skills of veterinarians with military training for more effective service.

The corps of veterinary officers is supplemented by a veterinary service of highly trained enlisted men who give technical assistance in the more routine inspections.

The Corps is one of the most versatile in the military establishment, and many and varied are its fields of operation. Some of its peacetime and wartime activities include:

Administrative duties in Washington, D.C., continental U.S., and overseas
Subsistence inspection duties and assignments at posts, camps, and stations
Instruction
Laboratory work
Military missions
Research
Assignments at ports
Assignments at the War Dog Receiving Station
Civil-Military Affairs Government work

Army Training of Veterinarians

Special schools are maintained by the Office of The Surgeon General, Department of the Army, to teach its veterinarians the specific applications the Army requires of their profession. Basic and advanced courses are offered both officers and enlisted men. Officers are given instruction in such subjects as staff procedures, inspection and control of foods, epidemiology, nuclear energy, nutrition, parasitology, pathology, virology, and veterinary aspects of chemical warfare.

Enlisted men are taught all phases of food and establishment inspection, refrigeration, warehousing, and sanitation.

Military officers from friendly foreign nations frequently are students at the U.S. Army Medical Service Meat and Dairy Hygiene School, Chicago. This School is staffed by Army veterinary officers, and it is here that officers and enlisted men of the Veterinary Service are trained in all phases of meat and dairy food hygiene.

The atomic age has opened up vast new horizons for the military veterinarian. To keep abreast with the ever-increasing hazards of atomic radiation on foods and food-producing animals, special courses have been established by the Army Veterinary Corps. The age in which we are living virtually dictates the need for such training courses and creates a highly specialized field of inquiry which logically falls within the sphere of the military veterinarian.

To put the knowledge now available to Army veterinarians to practical use, a course called "Examination of Food for Radioactive Contamination" has been instituted for selected members of the Corps at Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D. C. The curriculum includes the detection, evaluation, and identification of radio-active materials in foods and biological products of animal and plant origin. Thus, according to one of the Corps' radiobiology authorities, the military veterinarian attempts to break the chain of biologic cycling of radio-active contamination.

"Management of Mass Casualties" is the title of another course given to Army veterinarians and other medical personnel. It is given to Army veterinarians so that their medical "know-how" may be used to augment regular medical forces in treating mass casualties in the event of national disaster.

Peace and war bring different problems for solution to the Army veterinarian, as well as new opportunities. Some of the problems and opportunities are presented below.

Peacetime Problems

(a) On-the-job training is provided officers and enlisted men in meat packing and processing plants in the United States and overseas which handle Armed Forces contracts to familiarize them with all phases of food processing and inspection. This training *must* be given in peacetime; to wait until war-time would be too late.

(b) The Veterinary Corps attempts to raise the sanitary standards in overseas areas where military personnel are stationed or where subsistence may be procured.

(c) Veterinary officers are afforded opportunity to perform research on foreign animal plagues which could threaten the food supply or welfare of personnel in overseas assignments.

(d) The Corps provides an opportunity for veterinary officers to evaluate years of military experience, past wars, equipment, and techniques and to perform necessary research and development for new approaches to old and anticipated new problems.

(e) Inspection procedures are clarified and re-

U.S. Army photo

Inspection of hams for military specification requirements by U.S. Army veterinary service personnel in a meat packing plant in Germany. The sanitation of this and other packing and processing plants must meet rigid requirements which insure wholesome, quality food for our servicemen

U.S. Army photo

Procurement inspection of seafood in Japan by U.S. Army veterinary officer

evaluated, and methods of inspection are standardized.

(f) On occasion, foreign aid programs have required military Port Veterinarians' assistance in preparing for shipments of livestock. To insure adequacy of animal quarters, ventilation, heat, and water supply on ship, as well as the quality and quantity of forage, is the role of the Port Veterinarian.

Wartime Problems

(a) The inspection of food purchases, of storage facilities, and of plant sanitation are activities which are always greatly increased by war.

(b) Food supply lines must be rapidly and carefully evaluated.

(c) More rigid preventive medicine measures, required in wartime, are instituted to control and prevent epidemics of major food-borne and animal diseases communicable to man (Hull's *Diseases Transmitted from Animals to Man* (2) lists over eighty such diseases). These measures may be intensified by concentration of large numbers of personnel in military areas and to changing environments.

(d) Examination of dogs and transport animals for military service was increased in World War II and could possibly follow a like pattern in future conflicts.

(e) Procurement of food from indigenous sources increases during war, and construction and operation of emergency abattoirs in some areas is necessary.

(f) Often, in the past, there has been a need for veterinary personnel to care for captured enemy animals. This situation could recur.

(g) Members of the Army Veterinary Corps are afforded Civil-Military Affairs Government assignments where many responsibilities in the field of veterinary public health are encountered.

Food Procurement Duties

Food for the Armed Forces is procured today by the Military Subsistence Supply Agency of the Office of The Quartermaster General. Market Centers and Field Offices are located throughout the country, and Veterinary Corps officers are assigned to those where foods of animal origin, such as milk, butter, eggs, cheese, meat, poultry, and waterfoods, are being procured. They assure the purchasing and contracting officers that such foods comply with the specific requirements of the purchase order with regard to type, grade, class, condition, packaging, and marking.

Food supply lines to the Armed Forces are long, in some cases extending to every point on the globe, and they require constant surveillance. Inspections of meat and dairy foods are made before purchase, during processing, during government ownership, while in storage, and finally at the time of issue. The most important inspection is the final one—inspection of the food when it is issued.

Photo from Medical Audio Visual Dept., Walter Reed Army Inst. of Research

Testing can of powdered milk for evidence of radioactivity in connection with training in radio-assay techniques at Division of Veterinary Medicine, Walter Reed Institute of Research, Walter Reed Army Medical Center, Washington, D. C.

The variety and complexity of the American soldier's diet today makes the military veterinarian's task, likewise, varied and complex. Currently, there are approximately 150 military specifications for various meat and dairy foods—not to mention the fruits, vegetables, soups, cereals, condiments, baked goods, jellies, candies, and beverages, which are also included in his diet—a far cry from the repast of the Revolutionary War soldier who sat huddled over a campfire cooking his simple ration.

Role in Preventive Medicine

As long as food-borne diseases exist and food spoils, the military veterinary service will have a job to do. Food-borne diseases, the enemy for which the Army keeps a vigilant watch, fall into two categories according to Phelps (3): (a) food-borne infections (where the disease is produced by living organisms which enter the body with food), and (b) food intoxications (where the disease is produced by poisons forming or the presence of other substances in the food before it is eaten).

The Army Veterinary Corps, because of the qualifications and training of its personnel and its activity in food-borne and animal diseases communicable to man, occupies an important place on the Preventive Medicine team of The Surgeon General of the Army.

The war against epidemics goes on as vigorously during peacetime as it does in wartime. In this silent war, however, the tendency to let down the defense becomes greater in time of war, according to Zinsser, one of the world's leading bacteriologists, who says in his *Rats, Lice,* and *History* (4):

> . . . But however secure and well-regulated civilized life may become, bacteria, protozoa, viruses, infected fleas, lice, ticks, mosquitoes, and bedbugs will always lurk in the shadows ready to pounce when neglect, poverty, famine, or war let down the defenses . . . About the only genuine sporting proposition that remains unimpaired by the relentless domestication of a once free-living human species is the war against these ferocious little fellow creatures, which lurk in the dark corners and stalk us in the bodies of rats, mice, and all kinds of domestic animals, which fly and crawl with the insects, and waylay us in our food and drink. . . .

U.S. Army photo

Post-mortem inspection of viscera for such conditions as spotted liver, cysts, disease lesions, or other abnormal conditions which only a veterinarian can recognize and which may determine whether meat is fit for troop consumption

Role in Research

Members of the Army Veterinary Corps are engaged in several fields of research which may be classified as follows:

FOOD AND DISEASE RESEARCH

The Division of Veterinary Medicine, Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D. C., is responsible for the development and evaluation of new laboratory techniques used in analyzing food and food products. For example, special equipment is utilized here for the detection of added water in milk, excessive fat in hamburger, substitution of one kind of fish for another, and for the detection of other occasional irregularities on food contracts for the Armed Forces. These irregularities, if undetected, would result in certain food items not meeting required

specifications, thus robbing the serviceman of proper nutrition and the government of large sums of money. Here, and in Army field medical laboratories, chemical and bacteriologic analyses of food are made, as well as laboratory examinations required in the fields of virology, bacteriology, serology, and pathology—all of military medical importance and significance.

Research studies are also conducted here on diseases of animals communicable to man which are or may be of military importance. The Veterinary Division, Walter Reed Army Institute of Research, received special recognition for its work with leptospirosis (an animal disease communicable to man) when it was designated as the Leptospirosis Reference Laboratory by the World Health Organization.

Army veterinarians at the Armed Forces Institute of Pathology, Washington, D. C., are engaged in research projects involving the pathology of animal diseases communicable to man. Here one finds the largest collection of information on animal disease in the world, and it is available for study by scientists from all sections of the globe. Veterinary research activities at the AFIP are outlined briefly as follows:

(a) *Research in Comparative Pathology.* Army veterinarians are continually searching to uncover animal diseases with which to compare human diseases. Animals not only provide reservoirs for human infections, i.e., tuberculosis, encephalitis, psittacosis, rabies, but according to Army veterinarians, in many non-infectious human illnesses, the body changes occurring in humans are repeated in lower animals. The veterinary pathologists of the AFIP work with their medical colleagues to find and develop new tools for research in pathology.

(b) *Research in Exotic Diseases.* Research is being conducted on exotic animal diseases (those which today are not known in the United States) which could jeopardize the health of our troops, interfere with military operations, or threaten the United States in an emergency. Veterinary Corps officers serving in overseas areas collect specimens and send them to the AFIP, where they are studied by military veterinarians in order to develop techniques for the recognition of these diseases and to plan for their control. Teaching materials are prepared, based on this research, for use in training veterinarians to recognize foreign plagues. The position of Veterinary Corps officers in the military service permits many accomplishments in this area that otherwise could not be made. Other governmental agencies have evidenced intense interest in this work which is of importance to the nation in peace or war.

(c) *Research on Foods Preserved by Irradiation.* A research program of considerable military importance involves development of new methods of preserving foods by utilizing atomic sources of radiation. The Surgeon General of The Army has been assigned the reponsibility of detecting any possible toxic or deleterious effects in the nutritional value of foods for use by the Army which have been preserved by irradiation.

Radiation sterilization of canned meats and other foods containing meat is of interest to Army veterinarians. In this connection, the International Association of Veterinary Food Hygienists has invited representatives of the Army Veterinary Corps to participate in its program.

(d) *Virology Branch.* The Virology Branch of the Department of Pathology has been organized, staffed, and headed by military veterinarians since the facilities for this work became available at the AFIP. This is a natural development, according to authorities at the AFIP, because techniques are applicable equally to viruses of man and animals.

Army Veterinary Corps officers are rendering significant service as members of other military medical research teams. Projects on metabolism and nutrition are undertaken by research teams which include a military veterinarian whose specialized knowledge is extremely valuable. Not only is this specialized knowledge vital, but the interchange of ideas between medical and veterinary scientists working together on the same team promises to stimulate better research progress than either group could achieve working separately.

At the U. S. Army Medical Nutrition Laboratory, Fitzsimons Army Hospital, Denver, Army veterinarians trained in radiation dosimetry and food chemistry are engaged in nutritional and physiologic research in direct connection with military medical research projects.

At the U. S. Army Tropical Research Laboratory at Fort Brooke, Puerto Rico, a member of the Army Veterinary Corps works side by side with Army doctors in gathering and evaluating data on tropical diseases. Here again, military veterinary medicine contributes valuable assistance to human medical research.

CHEMICAL AND BIOLOGIC WARFARE RESEARCH

Army Veterinary Corps officers assigned to the Army Chemical Corps are engaged in developing methods of protection and decontamination of food exposed to chemical agents.

Army veterinarians are engaged in the field of research on biologic warfare so that effective steps may be taken to curb its effects. This type of warfare may be defined as the overt use of living organisms or their toxic products to cause damage, disability, or death in plants, animals, or man. The prime target is man, since this type of warfare could affect him either directly or indirectly.

NUCLEAR RESEARCH

In addition to research now being conducted by Army veterinarians relative to decontamination of radio-active foodstuffs, studies on the physiologic and pathologic effects of whole-body irradiation continues along with other nuclear problems.

Other Duties

Now a word about Army Veterinary Corps officers on special missions to foreign countries. These special missions are not to be confused with regular overseas assignments. These are quasi-diplomatic assignments for selected officers of the Corps who are proficient in a particular language and who possess large-animal experience. These officers serve in an advisory capacity on food production, processing, sanitation, and animal care and management. This valuable service cannot be underestimated in our diplomatic relations with these countries.

Domestic animals are held in high esteem by many foreign nations and are of great military importance to them. The terrain of some of these countries is such that the use of transport animals is a recognized part of their defense. The professional knowledge which these selected members of the Corps are in a position to offer is of signal importance.

Summary

To sum up the transition in scope of duties performed by the military veterinarian we have the farrier of Revolutionary War days with extremely limited knowledge, whose duties were to shoe and treat Army horses. He had no formal veterinary medical training, since, according to history, the first veterinary college in an English-speaking country was established in England ten years *after* the Revolutionary War (5).

Recognition of the need for inspection of meat for the Army in Colonial days by General Washington is revealed in J. C. Fitzpatrick's *The Writings of George Washington* (6). Washington wrote in 1756:

> . . . the Soldiers have made some complaints of their provision being very bad. The Commissary is ordered to inspect all that he can have the least doubt of and if there is any that can be saved, to put into fresh pickle; what can not, must immediately be thrown away.

A General Order issued by Washington in 1775 read: "Next to cleanliness, nothing is more conducive to a soldier's health, than dressing his provisions in a decent and proper manner. The Officers commanding Companies should therefore daily inspect the Camp Kitchen, and see the Men dress their food in a wholesome way."

The Civil War period increased the need for military veterinarians because of continued lack of food sanitation, inspection procedures, and the increase in number of transport animals used by the military.

The Spanish-American War and the food-poisoning scandals of that period intensified the need for military veterinarians to inspect food procured by the Army.

World War I was another period which demanded large shipments of foods of animal origin and transport animals to overseas areas. This was the era responsible for combining the food inspection and animal care duties of the Army veterinarian and further demonstrated the necessity for a separate Corps under centralized military control.

The Army utilized military veterinarians in World War II and the Korean conflict by (a) large-scale food inspection operations in emergency situations which were facilitated by peacetime training in meat packing and processing plants in the United States, (b) establishing emergency abattoirs and insuring sanitary sources of foods of animal origin in remote areas, and (c) assisting in procurement and care of transport animals, sentry and scout dogs used in such theaters as "China-Burma-India" and more recently in Korea.

The atomic age which presents hazards of chemical, biologic, and nuclear warfare on meat and dairy foods and food-producing animals creates a field of inquiry which falls within the realm of the military veterinarian.

The space age, which we are now entering, presents similar problems. Space travel, as it pertains to the military with its particular food problems—in-flight rations, new methods of preserving, storage, effects of heretofore unknown radiations on meat and dairy foods, and the effect of cosmic rays on animal tissue and its direct relation to medical research—will also be of concern to the military veterinarian.

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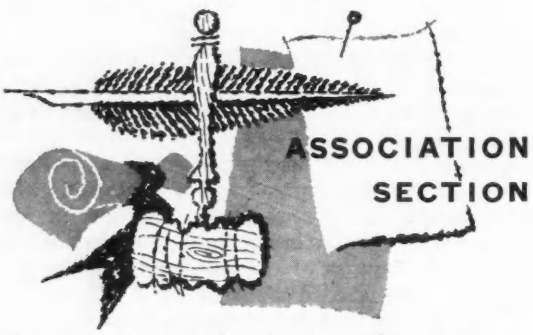


Report of the Nominating Committee, The American Dietetic Association, 1959-60[1]

THE NOMINATING Committee of The American Dietetic Association—A. June Bricker (as Chairman of the Nominating Committee of the House of Delegates), Patricia Brockbank, Alice M. Fenno, Ruth M. Kahn, Abby L. Marlatt, Ph.D., and Elizabeth McCune, Chairman—presents the following ballot for 1960-61:

PRESIDENT-ELECT

Adelia M. Beeuwkes: B.S., Michigan State College; M.S., Univ. of Michigan; dietetic internship, Univ. of Michigan Hospital, Ann Arbor

POSITIONS HELD:

- Therapeutic Dietitian, Univ. of Michigan Hospital, Ann Arbor
- Therapeutic Dietitian, New York Hospital, New York City
- Therapeutic Dietitian, Presbyterian Hospital, New York City
- Nutritionist, University Health Service, Ann Arbor
- Instructor in Nutrition, Div. of Hygiene and Public Health, Univ. of Michigan, Ann Arbor
- Instructor in Dietetics, Univ. of Michigan Medical School
- Present position—Associate Professor of Public Health Nutrition, Univ. of Michigan School of Public Health

PROFESSIONAL ACTIVITIES:

- Speaker, House of Delegates, A.D.A.
- Member, Coordinating Cabinet, A.D.A.
- Member, Council of the House of Delegates, A.D.A.
- Chairman, Community Nutrition Section, A.D.A.
- Chairman and Member, Journal Board, A.D.A.
- Member, Dietetic Internship Board, A.D.A.
- Chairman, Program Advisory Committee, A.D.A.
- Member, Finance Committee, A.D.A.
- Member, Publications Committee, A.D.A.
- Member, History of Nutrition and Dietetics Committee, A.D.A.
- Member, Committee to Study Life Membership, A.D.A.
- Member, Committee to Study Honorary Membership, A.D.A.
- Delegate, A.D.A.
- President, Michigan and Ann Arbor Dietetic Assns.

PUBLICATIONS:

- Papers in this JOURNAL and other professional publications

SPEAKER-ELECT OF THE HOUSE OF DELEGATES[2]

A. June Bricker: B.S., Battle Creek College; M.A., New York Univ.; dietetic internship, Univ. of Michigan Hospital, Ann Arbor

POSITIONS HELD:

- Assistant Therapeutic Dietitian, Univ. of Michigan Hospital, Ann Arbor
- Dietitian and Assistant Director of Residence, Connecticut College, New London
- Community Nutritionist, Council of Social Agencies, Manchester, N. H.
- Nutrition Director, Connecticut Dairy and Food Council, Hartford
- Director, Home Economics Bureau, Health and Welfare Div., Metropolitan Life Insurance Co., New York City
- Present position—Director, Field and Community Health Bureau, Metropolitan Life Insurance Co.

PROFESSIONAL ACTIVITIES:

- Delegate-at-Large, A.D.A.
- Member, Coordinating Cabinet, A.D.A.
- Member, Council of the House of Delegates, A.D.A.
- Chairman, Public Relations Committee, A.D.A.
- Member, Nominating Committee, 1955-56, 1959-60, A.D.A.
- Member, Finance Committee, A.D.A.
- Delegate, A.D.A.
- A.D.A. Representative on Committee on Health Education, National Health Council
- Member, Joint Committee on Rehabilitation of A.H.E.A.—A.D.A.
- Chairman, Community Nutrition Section Project, A.D.A.
- President, Secretary, and Public Relations Chairman, N. Y. State Dietetic Assn.
- Vice-President, Connecticut Dietetic Assn.
- Member, Sub-committee on Research in Home Economics Communication, National Project in Agricultural Communications

PUBLICATIONS:

- Articles in *Journal of Home Economics*, *Forecast for Home Economists*, and *Practical Home Economics*

Madge L. Myers: A.B., Univ. of Kansas; M.S., The Ohio State Univ.; dietetic internship, St. Marys Hospital, Rochester, Minn.

POSITIONS HELD:

- Therapeutic Dietitian, Evanston (Ill.) Hospital
- Therapeutic Dietitian, University of Chicago Clinics
- Therapeutic Dietitian and Assistant Director, Dietary Dept., Charity Hospital, New Orleans

[1]Other nominations may be made by nomination petitions signed by not less than 400 members of the Association, of whom not more than 30 shall be from any one state, assented to in writing by the person or persons named thereon as nominees, and filed with the Secretary at the office of the Association on or before April 15, 1959.

[2]The Nominating Committee of the Association certifies that on August 24, 1959, the Nominating Committee for the House of Delegates—Marjorie S. Arkwright, Ruth E. Tucker, Ph.D., and A. June Bricker, Chairman—submitted to the Chairman (of the Association Nominating Committee) the names and qualifications of the two members of the Association listed above for the office of Speaker-Elect of the House of Delegates for inclusion on the ballot of the Association for 1959-60.

Assistant Director, Dietary Dept., Ohio State Univ. Hospital, Columbus
Director, Dietary Dept., Peter Bent Brigham Hospital, Boston.
Present position—Instructor in Nutrition, Harvard School of Public Health, Boston

PROFESSIONAL ACTIVITIES:
Chairman, Diet Therapy and Professional Education Section Projects, A.D.A.
Delegate, A.D.A.
Member, Film Committee, A.D.A.
Member, Committee to Review and Revise Definitions which Appear in the *Dictionary of Occupational Titles*, A.D.A.
Member, American Hospital Assn.—A.D.A. Joint Committee
Vice-President, Ohio and Illinois Dietetic Assns.
President and Secretary, Massachusetts Dietetic Assn.

PUBLICATIONS:
Papers in this JOURNAL

SECRETARY

Mary Ellen Dambold: B.S., Oklahoma A. & M. College; dietetic internship, Michael Reese Hospital, Chicago

POSITIONS HELD:
Assistant Dietitian and Chief Dietitian, Grant Hospital, Chicago
Assistant Chief Dietitian, Michael Reese Hospital, Chicago
Administrative Dietitian, Univ. of Michigan Hospital, Ann Arbor
Present position—Chief Dietitian, Baylor Univ. Medical Center, Dallas

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
Member, Nominating Committee, A.D.A.
Member, Membership Committee, A.D.A.
President and Food Administration Section Chairman, Texas Dietetic Assn.

Virginia F. Harger: B.S., Washington State College; M.S., Kansas State College; dietetic internship, King County Hospital, Seattle

POSITIONS HELD:
Dietitian, Univ. of Nevada, Reno
Instructor, School of Home Economics, Ohio Univ., Athens
Assistant Professor of Dietetics, Stanford Univ., Palo Alto, Calif.
Army Dietitian, Birmingham General Hospital, Van Nuys, Calif.
Assistant to the Executive Secretary, The American Dietetic Assn., Chicago
Present position—Associate Professor in Institution Management and Director, Administrative Dietetic Internship, The Ohio State Univ., Columbus

PROFESSIONAL ACTIVITIES:
Delegate-at-Large, A.D.A.
Secretary and Member, Council of the House of Delegates, A.D.A.
Member, Coordinating Cabinet, A.D.A.
Member, Finance Committee, A.D.A.
Member, Membership Committee, A.D.A.
Delegate, A.D.A.
President and Vice-President, Ohio Dietetic Assn.
President, Columbus Dietetic Assn.

PUBLICATIONS:
Planning Community Meals, Service Bulletin, The Ohio State Univ. Agricultural Extension Service

DELEGATES-AT-LARGE

J. June Stein: B.S., University of Idaho; M.S., Western Reserve Univ.; dietetic internship, Univ. of Michigan Hospital, Ann Arbor

POSITIONS HELD:
Chief Dietitian and Therapeutic Dietitian, St. Luke's Hospital, Spokane
Present position—Nutrition Consultant, Washington State Dept. of Health, Seattle

PROFESSIONAL ACTIVITIES:
Member, Coordinating Cabinet, A.D.A.
Chairman, Community Nutrition Section, A.D.A.
Co-chairman, Committee to Combat Food Misinformation, A.D.A.
Delegate, A.D.A.
Member, special committees of Coordinating Cabinet and House of Delegates
President, Washington State Dietetic Assn.

Mary C. Zahasky: B.S., Framingham (Mass.) State Teachers College; graduate work, Teachers College, Columbia Univ. and New York Univ.; dietetic internship, Queen's General Hospital, Jamaica, N.Y.

POSITIONS HELD:
Administrative Dietitian, St. Vincent's Hospital, New York City
Army dietitian overseas in World War II
Administrative Dietitian, Memorial Hospital, Worcester, Mass.
Assistant Director of Dietetics, Univ. of Oklahoma Medical Center, Oklahoma City
Present position—Director of Dietetics and Director of Dietetic Internship, Univ. of Oklahoma Medical Center, Oklahoma City

PROFESSIONAL ACTIVITIES:
Treasurer, A.D.A.
Member, Nominating Committee, A.D.A.
Delegate, A.D.A.
Member, American Psychiatric Assn.—A.D.A. Joint Committee Working on Psychiatric Hospital Standards and Policies for the Dietitian
Member, American Hospital Assn.—A.D.A. Joint Committee
President, Oklahoma Dietetic Assn.

NOMINATING COMMITTEE[3]

The following candidates (five of whom are to be elected) for the Nominating Committee for 1959-60 have been selected as representatives of five geographic areas determined on the basis of distribution of the membership. Members are to vote for one person from each geographic area.

Geographic Area I[4]

Helen G. Ingerson: B.S., Cornell Univ.; dietetic internship, Eastman Kodak Co., Rochester, N. Y.

POSITIONS HELD:
Dietitian, Strong Memorial Hospital, Rochester, N. Y.
Dietitian, Bausch & Lomb Optical Co., Rochester, N. Y.
Dietitian, Western Electric Co., Chicago

[3]According to the constitution of The American Dietetic Association, the Chairman of the Nominating Committee of the House of Delegates also serves as a member of the Association Nominating Committee.

[4]Geographic Area I: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, and Pennsylvania

Chief Dietitian, Rochester (N. Y.) General Hospital
Present position—Educational Director for the Administrative Dietetic Internship and Assistant Supervisor of Nutrition Services, Eastman Kodak Co., Rochester, N. Y.

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
President, Bulletin Editor, and Public Relations Chairman, New York State Dietetic Assn.
President, Genesee Dietetic Assn.
Chairman, Rochester and Monroe County Nutrition Committee

Mary Agnes Wesner: B.S., Pennsylvania State Univ.; dietetic internship, Worcester (Mass.) Memorial Hospital

POSITIONS HELD:
Therapeutic Dietitian, Friends Hospital, Philadelphia
Chief Dietitian, Pottsville (Pa.) Hospital
Chief Dietitian, Washington (Pa.) Hospital
Present position—Administrative Dietitian, Allegheny General Hospital, Pittsburgh

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
Chairman, Committee on Aims and Goals, A.D.A.
President and Treasurer, Pennsylvania Dietetic Assn.
President and Food Administration Section Chairman, Pittsburgh Dietetic Assn.

Geographic Area II[5]

Janette C. Carlsen: B.S., Kansas State Univ.; M.P.H., School of Hygiene and Public Health, The Johns Hopkins Univ.; dietetic internship, The Johns Hopkins Hospital, Baltimore

POSITIONS HELD:
Instructor in Clinical Nutrition, The Johns Hopkins School of Nursing, Baltimore
Chief Therapeutic Dietitian, The Johns Hopkins Hospital
Present position—Dietitian-in-Charge, The Johns Hopkins Hospital

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
President-Elect, Treasurer, Chairman of Food Administration and Diet Therapy Sections, Bulletin Editor, and Public Relations Chairman, Maryland Dietetic Assn.
Contributor to Current Literature Section of this JOURNAL

May McBath: B.Sc., Univ. of Manitoba; dietetic internship, Michael Reese Hospital, Chicago

POSITIONS HELD:
Dietitian, Mound Park Hospital, St. Petersburg, Fla.
Army dietitian in World War II
Dietary consultant for private physicians
Present position—Nutrition Consultant, Florida State Board of Health, Mound Park Hospital, St. Petersburg

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
President, Florida Dietetic Assn.

[5]Geographic Area II: New Jersey, Delaware, Maryland, Washington, D. C., Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, West Virginia, Tennessee, Kentucky, Arkansas, and Louisiana

Geographic Area III[6]

Florence L. Adrian: B.S. and M.S., The Ohio State Univ.; dietetic internship, Henry Ford Hospital, Detroit

POSITIONS HELD:
Home Management Supervisor, U. S. Dept. of Agriculture, Ravenna, Ohio
Army dietitian in World War II
Therapeutic Dietitian, Mt. Carmel Hospital, Columbus, Ohio
Research Assistant, Ohio Agricultural Experiment Station, Columbus
Present position—Institution Nutrition Consultant, Division of Nutrition, Indiana State Board of Health, Indianapolis

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
Chairman, Committee on By-Laws of the House of Delegates, A.D.A.
Treasurer, Indiana Dietetic Assn.

Katherine Hart: B.S., Univ. of Wisconsin; M.S., Univ. of Chicago

POSITIONS HELD:
Director of Food Service, Union Bldg., Michigan State Univ., East Lansing
Present position—Head, Department of Institution Administration, Michigan State Univ.

PROFESSIONAL ACTIVITIES:
Chairman and Member, Dietetic Internship Board, A.D.A.
Chairman and Member, Administrative Internship Committee, A.D.A.
Member, Joint A.H.E.A.—A.D.A.—American School Food Service Assn. Committee

Geographic Area IV[7]

Edith Fae Cook: B.S., M.S., Texas Woman's Univ.; dietetic internship, Oklahoma State Univ.

POSITIONS HELD:
Cafeteria Manager, Roosevelt Jr. High School, Tulsa
Assistant Dietitian, Texas Woman's Univ., Denton
Dietitian and Assistant Professor, Southwestern Louisiana Institute, Lafayette
Present position—Director of Dietetics, Hermann Hospital, Houston

PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
President and Food Administration Section Chairman, Texas Dietetic Assn.
Food Administration Section Chairman, Louisiana Dietetic Assn.
Treasurer, South Texas Dietetic Assn.

Margaret Wilson Mangel: A.B., Indiana Univ.; M.S. and Ph.D., Univ. of Chicago; dietetic internship, Indiana Univ. Medical School, Indianapolis

POSITIONS HELD:
High school teacher, Union City, Ind.
Relief Dietitian, Methodist Hospital, Memphis
Instructor, Assistant Professor, and Associate Professor, Home Economics Dept., Univ. of Missouri, Columbia
Present position—Professor and Chairman, Home Economics Dept., Univ. of Missouri

[6]Geographic Area III: Michigan, Ohio, Indiana, and Illinois

[7]Geographic Area IV: Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas

PROFESSIONAL ACTIVITIES:
Member, Evaluation Committee for 41st Annual Meeting, A.D.A.
President, Vice-President, Education Section Chairman, and Career Guidance Chairman, Missouri Dietetic Assn.

Geographic Area V[5]

Elsie L. Bakken: B.A., Santa Barbara College, Univ. of California; M.S., Ohio Univ.; dietetic internship, Scripps Metabolic Clinic, La Jolla, Calif.
POSITIONS HELD:
Homemaking teacher, Blythe (Calif.) Jr. High School
Assistant Professor of Foods and Nutrition, Whittier (Calif.) College
Present position—Therapeutic and Teaching Dietitian, King County Hospital System, and Clinical Assistant in Medicine, School of Medicine, Univ. of Washington, Seattle
PROFESSIONAL ACTIVITIES:
Delegate, A.D.A.
Regional Continuing Education Representative, A.D.A.

[5]Geographic Area V: Hawaii, Alaska, Washington, Oregon, California, New Mexico, Arizona, Idaho, Utah, Nevada, Montana, Wyoming, and Colorado

President, Secretary, and Diet Therapy Section Chairman, Washington State Dietetic Assn.

Marjorie M. Morrison: B.S., Florida State College for Women; M.S., Univ. of Tennessee
POSITIONS HELD:
Teacher, Florida public high schools
Nutritionist, Florida State Board of Health, Jacksonville
Field Nutritionist, U. S. Public Health Service, Georgia, Florida, and Michigan
Director, Springfield (Mass.) Nutrition Service Bureau
Director, Nutrition Services, Florida State Board of Health, Jacksonville
Present position—Regional Nutrition Consultant, Children's Bureau, U. S. Dept. of Health, Education, and Welfare, Denver
PROFESSIONAL ACTIVITIES:
Chairman, Community Nutrition Section, A.D.A.
Regional Continuing Education Representative, A.D.A.
Delegate, A.D.A.
President and Career Guidance Chairman, Florida Dietetic Assn.
President, Vice-President, and Secretary, Jacksonville (Fla.) Dietetic Assn.

Food at the Winter Olympics

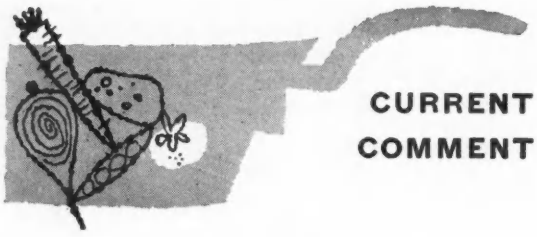
Feeding participants at the Winter Olympics at Squaw Valley, California, last month—not including spectators—required the preparation of 6000 meals a day. The market order that the eleven-day meet, February 18 to 28, included: 54,000 eggs, 55,000 half-pints milk, 700 gal. bulk milk, 700 gal. cream, 2,000 lb. ham, 2,000 lb. bacon, 1,000 lb. sausage, 10,000 lb. Prime ribs of beef, 7,000 lb. potatoes, 1,500 lb. rice, 7,000 gal. coffee, tea, and hot chocolate, and 1,000 gal. soup. In addition to the Prime ribs, thousands of pounds of steaks and other cuts of beef were served, as well as veal, lamb, poultry, and enough fish so that it appeared on every dinner menu. There were also appropriate amounts of fresh and frozen vegetables (two accompanied each dinner), hot cereals, puddings, cakes, and pies.

Western barley-feed beef was decided upon after studies at the University of California at Davis, in collaboration with the meat purveyor, indicated that it equalled Midwest corn-fed beef in both quality and flavor. All meat delivered at Olympic Village was pre-portioned, packaged in vacuum sealed, Cryovac bags.

The menus, planned on a seven-day cycle, were presented in different languages, since participants came from thirty-four nations. Each dinner menu included a foreign dish, such as German *sauerbraten* with Bavarian sweet and sour cabbage, *stomppot* from the Netherlands, and Danish potato dumplings. Athletes had rib roast, broiled steaks, or roast beef for evening meals every day. Because training table fare prohibited highly seasoned sauces or gravies, the beef was served "au naturel," with perhaps an "au jus" or natural gravy added. Other sauces and gravies were available for non-competitors, such as officials, trainers, coaches, and newsmen.

The athletes were served cafeteria style in their own dining hall, while officials had an adjoining dining room with table service. For those who were in the field at lunch time, box lunches—two meat, fish, and/or cheese sandwiches, hard-cooked eggs, pickles, fruit, and cake—were distributed. Members of the press ate in their own press building, where a hot and cold buffet was available at all hours. Because of varying deadlines of newspapers around the world, the newsmen worked around the clock, often late at night, while the rest of Olympic Village slept.

The executive chef, Peter Rasmussen of San Francisco, had a kitchen crew of: 15 to 18 cooks, 2 bakers, 1 butcher, a head pantryman, 5 women salad makers, 3 vegetable preparation men, 6 box lunch makers, 12 dishwashers, 2 pot washers, 1 kitchen porter, 10 cafeteria servers, and 15 bus boys. Bread, rolls, and cake were supplied by commercial bakeries, thus requiring only two bakers to make puddings, pies, and other desserts. Equipment for the 50 by 75 ft. kitchen included: 9 bake ovens, 6 cooking ranges, 3 stock pots (50-, 60-, and 100-gal. capacities), 2 steam-jacketed kettles, and a dishwashing machine.



CURRENT COMMENT

Symposium on Prenatal Nutrition[1]

ERNESTINE BECKER McCOLLUM

Assistant Professor of Biochemistry, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore

ON OCTOBER 16 and 17, 1959, a Symposium on Prenatal Nutrition was sponsored by the Department of Biochemistry, School of Hygiene and Public Health, The John Hopkins University, and the Department of Obstetrics of the Johns Hopkins Hospital, Baltimore, with the financial assistance of The National Vitamin Foundation. As would be expected, evidence was considered for and against the need during pregnancy and lactation of supplements of iron, protein or amino acids, and certain vitamins, especially B_{12} and folic acid.

Anemia Not Necessarily the Chief Effect of Iron Deficiency

Dr. Ernest Beutler, Department of Medicine, University of Chicago, pointed out that in some patients with clinically established pernicious anemia, hemoglobin is very low, but they are symptom free. On the other hand, some patients with iron deficiency complain of marked symptoms, even though their hemoglobin levels are relatively high. In such patients, response to iron therapy is dramatic and occurs before an increase in hemoglobin and rise in red cell count; improvement of appetite, alleviation of fatigue and lassitude, and other more vague symptoms follow promptly. Hence, Beutler sought other criteria for diagnosing iron deficiency.

Studies on the tissues of rats kept on iron-deficient diets showed that the levels of certain iron-containing enzymes in the liver and kidneys were significantly lower than in similar tissues from animals receiving the same diet plus iron.

Dr. Beutler also called attention to studies indicating that the dermal perspiration of iron-deficient patients is lower in iron than that of normal persons.

He reported studies of women with normal hemoglobin levels in some of whom the level of bone marrow iron was normal and in others low. In these subjects, he observed the effects of: (a) iron therapy for one month, (b) placebos for one month, and (c) bismuth therapy for one month. The subjects, as well as those who examined them, did not know the nature of the supplements given. Only the women who were initially iron deficient, as indicated by low levels of bone marrow iron, showed hemoglobin increases and a distinct preference for the iron-containing supplement.

Beutler concluded that maintenance of normal hemoglobin level alone cannot be considered as evidence of an adequate iron supply. Maintenance of normal bone marrow levels of iron and normal levels of iron-containing enzymes in the liver and kidneys are more sensitive criteria. He favors the administration of iron supplements in pregnancy, especially in women who experience fatigue and loss of appetite without having the classical symptoms of lower hemoglobin and red cell count.

Vitamin B_{12}

Studies on pregnant women reported by Dr. Andre Hellegers, Department of Obstetrics, The Johns Hopkins School of Medicine and Hospital, show that serum vitamin B_{12} levels of the fetus at the time of delivery, as measured from samples of umbilical cord blood, are invariably higher than in samples of the mother's blood obtained at the same time. This apparently "parasitic" action on the part of the fetus in relation to its mother's vitamin B_{12} supply led to studies on pregnant women and rats to learn if, during pregnancy, there is a mechanism of compensation against excessive depletion of the mother's vitamin B_{12} stores.

As pregnancy advances, the B_{12} content of the mother's serum falls and the serum concentration of the vitamin is higher on the fetal side of the placenta than on the mother's side.

To learn whether the rate of absorption of vitamin B_{12} is affected by pregnancy, comparable groups of pregnant and non-pregnant women were studied. Each group was sub-divided into three groups. The non-pregnant groups consisted of women of child-bearing age and backgrounds comparable to those of the pregnant group. Analogous sub-groups were given 1000 mcg. vitamin B_{12}, 500 mcg., and 250 mcg., respectively. Serum vitamin B_{12} levels were obtained on all subjects prior to vitamin B_{12} administration and ½ and 3 hr. after administration. At all three levels of administration, absorption of the orally administered B_{12} was significantly greater in the pregnant than in the non-pregnant women.

Similar studies on rats conducted by Dr. Kunio Okuda of the Department of Biochemistry, The

[1]Mrs. McCollum attended this symposium as the official representative of The American Dietetic Association.

Johns Hopkins School of Hygiene and Public Health, showed the same differences. In spite of increased vitamin B_{12} absorption, the B_{12} level of the serum and of the liver and kidneys of pregnant rats actually decreased, presumably due to the demands of the fetus, which seems to be the main beneficiary of the increased vitamin B_{12} absorption rate in pregnancy.

Repeated successive pregnancies in the rat intensified the depletion of the stores of B_{12} in the liver. If the liver B_{12} concentration of the nuliparous rats were taken as 100 per cent, after four pregnancies, it was reduced to 35 per cent, even though a diet adequate in B_{12} and all other nutrients was fed.

In the rat, a deficiency of B_{12}—whether due to feeding a diet lacking the vitamin or to feeding an inhibitory factor or vitamin antagonist—results in sterility in females which can be corrected by administration of B_{12}.

Maintenance of a constant B_{12} serum level during pregnancy in women requires a daily intake of either 100 mcg. vitamin B_{12} or 25 mcg. B_{12} plus 5 mg. folic acid. Since pernicious anemia is rare during pregnancy and serum B_{12} levels rapidly return to normal after parturition, the routine administration of supplementary sources of the vitamin is unnecessary.

Eight of nine pregnant women studied had less than 100 mcg. vitamin B_{12} per 100 ml. serum, but the fetuses had normal levels in all cases except one; this infant proved to be a cretin. Four other cases were subsequently observed in which the serum B_{12} level of the mother and the cord at birth were low and the infants were cretins. Administration of B_{12} to newborn cretins rapidly raised the serum vitamin B_{12} to normal levels.

Thyroidectomized rats absorb B_{12} poorly, and administration of thyroid substance improves absorption of the vitamin in such animals. Sterility is an invariable accompaniment of hypothyroidism. Feeding a combination of B_{12} and thyroid substance is more effective than either given alone. It appears that B_{12} plays a role in the correct functioning of the thyroid, and that it, as well as the normal activity of this gland, is essential for the maintenance of normal reproduction in the rat.

Vitamin B_{12} and Folic Acid

Dr. Victor Herbert of Boston City Hospital offered evidence of the role of vitamin B_{12} in folic acid metabolism. Soon after the recognition and identification of folic acid as a member of the B-complex, it was demonstrated experimentally and clinically to be effective in the treatment of certain megaloblastic anemias, especially those of infancy and pregnancy. In pernicious anemia, where the primary deficiency is B_{12}, folic acid will almost invariably induce, and usually maintain for extended periods, adequate erythropoiesis. However, unlike B_{12}, folic acid will not arrest the neuropathologic manifestations of pernicious anemia. In fact, in some patients initially showing only the hematologic symptoms of pernicious anemia, the administration of folic acid without B_{12} may precipitate the neurologic symptoms.

Experimental and clinical evidence indicates that folic acid serves as a precursor of an essential co-factor or group of related co-factors, without which a variety of reactions cannot proceed at a rate compatible with life.

Conjugates of folic acid are present in foods. In the gastric secretion, these conjugates must be dissociated to render the folic acid available. Vitamin B_{12} apparently effects this dissociation. Some patients with folic acid deficiency cannot use folic acid conjugates unless accompanied by B_{12}.

The liver normally stores folic acid as folinic acid (citrovorum factor). In untreated pernicious anemia, the liver stores of the vitamin are in the form of folic acid rather than folinic acid.

In B_{12}-deficient patients maintained for five to ten years on folic acid therapy, the intramuscular administration of 1 mg. vitamin B_{12} was followed by a doubling of the urinary output of the citrovorum factor for three days.

Formimino glutamic acid, an abnormal metabolite of histidine, appears in the urine in some, but not all patients with anemia due to folic acid deficiency. The urinary output of this metabolite increases in patients with B_{12} deficiency, which also is evidence of the interrelationship between folic acid and vitamin B_{12}.

Protein

Dr. Anthony A. Albanese, Director of the Nutritional Research Laboratory, St. Luke's Convalescent Hospital, Greenwich, Connecticut, emphasized the importance of protein in the diet of the pregnant and lactating woman and directed attention to appropriate techniques and criteria for the determination of nutritional status for this essential in pregnancy. Most obstetricians recognize that the protein needs in pregnancy and lactation are much greater than those of the unencumbered adult. Meeting them may be difficult because of poverty, ignorance, poor food habits, food idiosyncrasies, or the fear of having a difficult labor due to the development of a large baby.

The idea that a high-protein intake during pregnancy is responsible for toxemia has been refuted by controlled clinical experience. It is generally accepted that only where there is nitrogen retention, as in chronic renal disease, or where there is an acute inflammatory condition, as in acute glomerulonephritis, is a lowered protein intake advisable.

Plasma protein measurements, total or as fractions, are used as a criteria for evaluating the nutritional status of the pregnant woman and for the nutritive value of her dietary. Albanese offered evidence in support of his contention that hemoglobin level is a better index in the detection of protein undernutrition than plasma protein levels.

Another criterion for determining nutritional status in pregnancy is the plasma amino acid level. Albanese stated: "Measurements of total plasma amino nitrogen have shown that low levels are common in pregnancy. Protein load tests have disclosed normal absorption of protein with a possible exception in pre-eclampsia. Determination of total and specific amino acid changes in convalescent adults and infants in our laboratory reveal that these measurements may serve as useful criteria in the evaluation of nutritional status of the patient, as well as the availability of amino acids in the dietary. The application of these measurements to problems of prenatal protein nutrition is recommended."

Prenatal Diets and Supplements

Bertha S. Burke, Associate Professor of Child Nutrition, Harvard University School of Public Health, Boston, and Dr. William J. McGanity, Department of Obstetrics and Gynecology, Vanderbilt University Medical School, Nashville, presented data to show that although the nutritional needs of the pregnant and lactating woman are greater than those of the non-pregnant one, they can readily be met without resort to the use of special nutrient supplements and concentrates. Both stressed the desirability of the prospective mother's receiving sound dietary advice as a routine part of prenatal care.

Mrs. Burke emphasized that the nutritional state of the mother when she enters pregnancy and during pregnancy is most important to the future health of the child. Faulty nutrition during pregnancy may affect the pregnant woman or her fetus in ways not usually considered to be signs of malnutrition. Nutritional allowances have been recommended by the Food and Nutrition Board of the National Research Council after careful consideration of data compiled from clinical experience and experimental observation. Evaluation of nutritional status should be a routine part of the prenatal examination.

Mrs. Burke cited the results of the classic study of a group of women drawn from the prenatal clinics of the Boston Lying-in Hospital (1). An over-all relationship was found between a good or excellent diet during pregnancy and good physical condition of the infant at birth.

"In the 216 cases studied, all the stillborn infants, all except one of the infants who died in the neonatal period, all except one of the premature infants, most of the infants with major congenital defects, and all of the infants considered to be 'functionally immature' were born to women in the poorest diet group. In contrast, 94 per cent of the infants born to women on good or excellent diets during pregnancy were in good or excellent condition at birth. A significant relationship was found to exist between the antepartum diet and the course of pregnancy, although this relationship was less pronounced than that with the condition of the infant at birth. The relationship between the general dietary rating during pregnancy and the incidence of toxemia was also significant. There were many more difficult types of delivery in the poorest diet group, despite the fact that these infants at birth averaged almost 3 lb. lighter in weight and several centimeters shorter in length than the infants of mothers whose diets were good or excellent."

A significant relationship was found to exist between the protein content of the mother's diet during pregnancy and the birth weight and length of the infant. With each 10-gm. increase in daily protein intake (over a range of 45 gm. or less to 85 gm. or more), the birth weights and lengths of the infants increased. An intake of 75 gm. or less of protein daily during the latter part of pregnancy resulted in an infant who was shorter, lighter, and less likely to receive a good pediatric rating.

Furthermore, 134 of the children in this study were followed until they were eighteen years old. The children whose mothers received very low protein diets during their pregnancies were, as a group, shorter at this age than those whose mothers had higher protein intakes. It appears that inadequate protein intake during pregnancy may stigmatize the offspring throughout life.

To test further the effect of the mother's diet on the developing fetus, studies were made on the livers of fetuses and newborn infants dying less than 48 hr. after birth during a five-year period. Protein, iron, vitamin A, thiamine, riboflavin, and ascorbic acid were measured. With the exception of iron content, the livers of the offspring studied reflected the dietary inadequacies of the mother during pregnancy.

Nutrition counselling as part of the multidisciplinary approach to the mother during her pregnancy, continuing through her stay in the hospital, and until the child is a year old can accomplish much in helping the mother achieve a desirable weight. This implies that the underweight woman should be allowed (even encouraged) to gain more, while for the overweight woman, caloric intake alone should be restricted, making sure that protein, mineral, and vitamin needs are fully met. When necessary, the physician, nurse, nutritionist, and other clinic personnel who are to help the patient will need to spend time to motivate her to want to

improve her food habits. "Don't ask her to change her food habits without telling her why! Explain what not to eat and why, as well as what to eat and why, in terms that the patient can understand and carry out under her existing living conditions.

"In the dietary instruction, effort should be directed first toward securing the 'protein nucleus' of food (75 to 80 gm. protein daily) during at least the latter half of pregnancy, since apparently about 20 gm. daily in addition to 1 gm. per kilogram body weight are required to care for both maternal and fetal storage.

"Protein is no longer restricted for fear of producing toxemia. In fact, it is generally accepted that a high-protein intake in a well balanced diet helps prevent toxemia.

"If 75 to 80 gm. protein daily represent the protein goal during the last five lunar months of pregnancy, a small percentage of women attain this target of their own volition. In our early study, only 32 per cent consumed 70 gm. or more daily, 38 per cent less than 55 gm., and 14 per cent less than 45 gm. during this important period of growth and development. While our socio-economic conditions have improved so that these conditions do not exist to the extent they did, a large number of women still, for various reasons, such as ignorance, food dislikes, long-established cultural patterns, as well as the high cost of food today, do not eat a diet well supplied with protein.

"In general, from a practical standpoint, if the pregnant woman's protein needs are supplied by the right choice of foods as described in our folder 'Daily Diet During Pregnancy,' all other nutrients except ascorbic acid and vitamins A and D will be provided in reasonably good amounts, because of their natural association with protein in foods. When protein is deficient in the diet because milk is in short supply, calcium and possibly phosphorus will also be deficient. Iron, riboflavin, and other B vitamins are likely to be short in a low-protein diet.

"The pregnant woman, whatever her cultural, social, or economic status, needs a physician not only with obstetrical skill but also one with an appreciation of the nutritional needs of both mother and fetus, and of all other factors that make for excellent prenatal care."

THE VANDERBILT STUDY

Like Mrs. Burke, Dr. McGanity believes that though pregnancy is a period of rapid growth and development and is accompanied by physiologic and metabolic changes, the increased nutritional needs of the pregnant woman can be met by food sources alone.

The present-day expectant mother in the United States, unlike her pre-World War II predecessor, is no longer willing to accept obesity as the inevitable aftermath of pregnancy. Studies indicate that the average caloric consumption by non-pregnant, non-lactating women is 400 to 500 calories below the National Research Council's dietary allowance. This is as it should be in an era of mechanized living and labor-saving, pushbutton devices.

Dietary, biochemical, and clinical assessments were made over a period of years on 2338 pregnant, white women who attended the obstetric clinic of Vanderbilt University in Nashville. These patients fell into the lower income brackets ($1200 to $3000 per year). Though the average daily intake of nutrients was not equal to those of the Recommended Dietary Allowances, they were not disturbingly low. The food patterns were gratifyingly varied and revealed no widespread disturbing food prejudices or fads associated with pregnancy. The diets showed frequent consumption of the necessary nutrients supplied by milk and eggs, green and yellow vegetables, and citrus and other fruits.

There was a somewhat surprising decrease of approximately 200 calories in intake between the second and third trimester. Associated with this was a similar decrease in consumption of most of the other individual nutrients. Though this reduced intake was attributable in part to the physician's advice to some who were obese, who gained weight too rapidly, or who were pre-eclamptic, the decreased intake was not limited to these categories. Dr. McGanity considers that the recommended allowances for caloric intake during pregnancy are too high for today's expectant mother. The reduced intake during the latter months of pregnancy reflect lessened needs due to lessened activity of the mother as well as a desire on the part of the young woman to remain slim.

The Vanderbilt studies showed that the change in blood constituents fell into four patterns: (a) A decline during the first thirty-two to thirty-four weeks of gestation followed by a postpartum rise; this applies to the mean hematologic values, total serum protein, serum vitamin A, and the urinary excretion of thiamine and riboflavin.[2] (b) A progessive increase during pregnancy followed by a postpartum decline; this pattern was exhibited by serum carotene, tocopherol, and the urinary excretion of N-methylnicotinamide. (c) A slight decrease in the serum ascorbic acid levels during gestation followed by a further sharp decline postpartum among lactating mothers. This was not dependent on the intake of ascorbic acid, since it occurred at all intake levels. When the daily intake of this nutrient was above 80 mg., postpartum serum levels could be maintained at approximately 0.3 mg. per 100 ml. This is in contrast to the serum ascorbic

[2]The upturn in hemoglobin values occurred approximately four to six weeks earlier if a mother subsequently gave birth to a premature infant.

acid levels of 0.6 to 0.8 mg. during gestation, with the same level of dietary intake. Mothers who fed their infants artificially did not show this postpartum drop-off. (d) A progressive increase in the absorption and utilization of iron as pregnancy advances. During the last ten weeks of pregnancy, the uptake of iron was three times that of the first trimester level.

WEIGHT

Obesity was recorded for 15.7 per cent of the women and varied from 11.5 per cent during the first trimester to 19.3 per cent during the third trimester. Undernutrition was least frequently seen during the last trimester. No instances of clinically recognizable deficiency disease were encountered.

The number of overweights increased as age and parity advanced. Among these, there were significantly higher mean hematologic and serum protein and vitamin A values, a threefold increase in preeclampsia, more stillborn children, and a lowered frequency of puerperal morbidity.

The underweight group (less than 85 per cent standard weight) recorded the highest dietary intakes and was concentrated in the lower parity groups. In this group, there was an increased frequency of prematurity, and more mothers artificially fed their infants. This group had fewer neonatal deaths and congenitally malformed infants.

In a normal pregnancy, the expectant mother will require the absorption and utilization of 700 to 1000 mg. elemental iron for her own needs and those of the fetus. If bleeding is absent during gestation, she is able to conserve about 240 mg. elementary iron as a result of the cessation of menstruation. In addition, her ability to absorb and utilize iron is enhanced at least threefold during the third trimester when her needs and those of the fetus are greatest. Coincident with the changes in circulating blood volume and increased hemoglobin mass, there is a progressive fall in the mean hematologic values until the thirty-second or thirty-fourth week of pregnancy. Then a significant rise occurs prior to delivery that continues upward during the puerperium. In the case of the hemoglobin, this rise amounts to 0.8 gm. per 100 ml. during the last six to eight weeks of pregnancy and is independent of either the nutrient iron intake or iron supplementation.

Women whose hemoglobin level was less than 10 gm. per 100 ml. were classified as the "low hemoglobin group." Most of these showed a rise in hemoglobin levels at the time of their postpartum examination. The few who did not show this rise had histories indicating excessive blood loss during the latter part of pregnancy, delivery, or puerperium, and thus suffered a conditioned iron deficiency. The need for iron supplementation in such cases is evident.

From conception through parturition and lactation, maternal nutrition should provide adequate amounts of those nutrients that are essential for the mother's maintenance and the growth and development of the fetus. Dietary intakes greater than the Recommended Dietary Allowances will not bestow protective benefits during pregnancy. It appears that the recommended standards for calories are too high for today's expectant mother. A dietary that will provide the essential nutrients is readily attainable from food. The common obstetric routine of broad-spectrum nutritional supplementation is questioned, both as to the need and as to dosage level.

Genetics

Dr. Lockard Conley, Professor of Medicine, The Johns Hopkins School of Medicine and Hospital, presented data less directly concerned with the consideration of prenatal nutrition. He spoke on the relation between genetics and vitamin B_{12} deficiency, calling attention to the fact that nutritional deficiencies are not always due to dietary deficiencies *per se*.

Pernicious anemia, achlorhydria, and cancer of the stomach are familial diseases. A deficiency of B_{12} results in the development of pernicious anemia. Intrinsic factor, present in normal gastric secretion, is essential for the absorption of B_{12}. Patients with pernicious anemia apparently inherit the tendency toward a reduced output of intrinsic factor and consequent susceptibility to pernicious anemia. The tendency to develop the disease increases with age. It is rarely found in children or young adults.

Conley considers pernicious anemia a disease which results from an inherited defect. When both parents have the disease, some or all of their children are certain to develop it. Susceptibility to pernicious anemia might be indicated by poor absorption of B_{12} before any frank manifestations of the disease develop. Reduced capacity to absorb the vitamin might be characteristic of families of patients with pernicious anemia.

Studies of the B_{12} absorption of several groups of people related or unrelated to patients with pernicious anemia bear out the correctness of this assumption. In a group of people with no known history of pernicious anemia and in patients with unrelated diseases, excretion of a test load of vitamin B_{12} was high; but in relatives of patients with pernicious anemia, urinary excretion of the vitamin after administration of the test load was low. Differences were apparent in each age group studied—0 to 20 years, 21 to 40 years, 41 years and over—and increased with age.

Anomalies

Dr. Joseph Warkany, Professor of Pediatrics Research, University of Cincinnati College of Medi-

cine, presented data drawn from experiments on animals in which congenital malformations had been induced by subjecting the females to dietary deficiencies during pregnancy. He pointed out that until about twenty-five years ago, congenital malformations were thought to be of genetic origin. In 1933, Hale, of Texas, demonstrated that gilts fed a diet deficient in vitamin A (and possibly other factors) produced young pigs with small or no eyes, accessory ears, cleft palate, hare-lip, and ectopic kidneys.

Warkany has produced skeletal defects in rats by feeding the females riboflavin-deficient diets during pregnancy. In his laboratory, too, congenital abnormalities have been induced in a high percentage of the young of female rats which have been kept on a diet deficient in vitamin A but given enough carotene to insure growth and maturation until they could be bred. After breeding, the females have been fed a purified diet deficient in vitamin A. The young of these females have showed striking structural abnormalities of the eyes, urogenital tract, the diaphragm, the heart, and the aortic arches. Only fetuses over eighteen days old have shown the characteristic keratinizing epithelial metaplasia of vitamin A deficiency.

To produce anomalies, it is necessary to use borderline diets or to have periods of repletion at different stages of pregnancy. If the dietary factor being studied is present in amounts above the critical level, no abnormalities develop; if the depletion is too severe, abortion occurs. For example, in his studies with vitamin E, Warkany found it necessary to limit the depletion period to early pregnancy and to feed an adequate diet for three days in the midgestation period so that the deformed fetuses produced by deficiency early in pregnancy could be carried to term.

Feeding antimetabolites has shortened the depletion period required for producing congenital malformations and has increased the yield of abnormal offspring that can be produced at each pregnancy. Feeding a folic acid-deficient diet plus a folic acid antagonist on the ninth, tenth, and eleventh days of pregnancy resulted in a variety of malformations, such as eye and brain defects, hare-lip, and other facial anomalies in 99 per cent of the offspring. Deficiencies produced in this way affect the fetuses more than the mothers. These remain in good health and gain weight during the short experimental period.

Malformations were also produced in the young of rats fed huge doses of vitamin A during pregnancy.

Thiersch observed hydrocephalus, meningo-encephalocele, hare-lip, and cleft palate in human embryos whose mothers had been given aminopterin to induce therapeutic abortions.

Susceptibility to congenital malformations by dietary means varies from strain to strain and species to species. One strain of mouse treated with cortisone produced young 100 per cent of which had cleft palates, whereas the offspring of another strain similarly treated was completely free of such deformities. Also, general starvation for a brief period in pregnancy results in malformations in the young of mice but not in those of rats.

Dr. Warkany emphasized the hazard of attempting to equate such animal experiments with human conditions. The animals are subjected to artificial environmental conditions which are unlikely to occur in people. However, in certain cases, an adverse condition of the mother may impair development of human fetuses. The use of aminopterin as an abortificient is one such case. Another example is endemic cretinism associated with endemic goiter which has been attributed to iodine deficiency. Although the etiology of endemic goiter is complex, these conditions disappear when iodized salt or improved diets are introduced into endemic areas.

Todd M. Frazier, Director of the Baltimore City Health Department's Bureau of Biostatistics, presented a preliminary study of statistics gathered in Baltimore during the past five years. These data showed that in 12,000 deliveries, except for bone and joint deformities, the rate of congenital malformations was higher among white infants than Negro. The high incidence of polydactylism among the Negro infants accounted for the excess of bone and joint deformities.

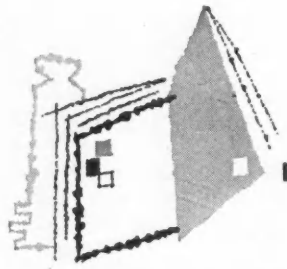
Reference

(1) Burke, B. S.: Nutritional needs of pregnancy—their importance to mother and fetus. Bull. Maternal Welfare 12:12 (Sept.-Oct.), 1956.

Tranquilizers Promote Growth in Broilers

Tranquilizers can be of some benefit in improving the growth rate and feed conversion of broilers, according to Dr. J. C. Fritz, Director of Nutrition Research, Dawes Laboratories. In speaking before the annual meeting of the Federation of American Societies for Experimental Biology in April, 1959, Dr. Fritz noted that sodium bromide performed as well as some of the newer transquilizers. Bromine has been suggested as an essential nutrient, but this is the first evidence that the agent in sedative dosages has beneficial growth results.

In contrast to a report from Iowa that a thyroid depressant drug had beneficial results in cattle fattening rations, Dr. Fritz reported that these goitrogenic agents were of no benefit, and in some cases detrimental, in broiler rations.



BOOK REVIEWS

Human Nutrition and Dietetics. By Sir Stanley Davidson, A. P. Meiklejohn, and R. Passmore. Foreword by Lord Boyd Orr. Baltimore: The Williams and Wilkins Company, 1959. Cloth. Pp. 844. Price $15.

The authors, all physicians associated with the University of Edinburgh, have an imposing record of accomplishment in teaching, research, clinical practice, and public health programs. Among the acknowledgments are ones made to Kathleen Rose, Senior Dietitian, Edinburgh Royal Infirmary, who helped with all the diets, and to Fiona Ritchie, who assisted with the tables of food analyses.

The general topics are divided into six parts: the physiology of nutrition; foods and food poisons; primary nutritional diseases; nutritional aspects and dietetic treatment of general diseases; public health; and diet and physiologic stress. In most cases, the subject matter is introduced with references to history; a lucid presentation of the chemistry and physiology is made; a discussion of controversial viewpoints is included; and areas where further research is needed are pointed out. While this sequence has lengthened the book, it leaves a refreshing amount of room for thoughtful digestion of the newer knowledge of nutrition.

This book will make a notable contribution, particularly in those schools where teaching is directed to enabling the student to think for himself. Topics are well documented, critical evaluations of the literature are made, gaps in our knowledge are noted, areas for further research are indicated, and realistic concern is shown for the problems of applied nutrition. With this kind of a background, it should be possible for those on the medical team to work together with fewer misunderstandings and misdirected efforts. Dietitians and nutritionists will find this book well worth an important place in their libraries.

The Heinz Handbook of Nutrition. New York: McGraw-Hill Book Company, Inc., 1959. Imitation leather. Pp. 439. Price $5.75.

Benjamin T. Burton, Ph.D., formerly a research chemist and technical director for the food and pharmaceutical industry and now Staff Consultant in Nutrition to the H. J. Heinz Company, has compiled this book for the company.

Facts about the chemistry of normal nutrition and the composition of foods make up a large part of the content, as in the company's former publication, *Nutritional Data.* In this book, however, the subject matter has been expanded to include nutrition and diet in disease, brief comments on food sanitation, toxicology, and modern food technology. References are conspicious by their absence.

Planning Homes for the Aged. By Geneva Mathiasen and Edward H. Noakes. New York: F. W. Dodge Corporation, 1959. Cloth. Pp. 119. Price $12.75.

The increasing number of elderly persons in institutions, according to population data, is one factor indicating a need for more homes for the aged in the future. The philosophy of care and practical criteria required in homes for older persons are important factors in the design and details of the buildings which shelter them. The problem, as expressed in this book, is: "Should we think of residents of homes for the aged as people beginning a new and more sheltered life when all the opportunities of social contact are preserved and even enhanced or are we to give more weight to the ones who need protective and health care?"

The purpose of this book is to assist architects and planners of homes for aged by providing information on the philosophic base and practical criteria required in building such homes.

Section I is comprised of a series of articles written by eleven contributors, experienced in such areas as: community needs or resources, location and building site, common services, residence unit and room, health needs, administrative and staff facilities, service and mechanical facilities, construction materials and costs, design and function of the architect.

The description of dietary facilities is, unfortunately, not only sketchy but promotes many outmoded concepts. The illustrated layouts in this area are characterized by long disapproved practices in dietary planning: too-small kitchens; no outside windows; too little refrigeration space; use of the "diet kitchen"; division of activities on two levels which is awkward and uneconomical; no provisions for space for tray-service systems for bed patients. It is obvious that one would need to look beyond this book to experts in the dietetic field for assistance in planning modern, functionally adequate dietary facilities for homes for aged.

In Section II, six prize winning designs selected from an architectural competition conducted by the National Committee on Aging in conjunction with *Architectural Record* and *The Modern Hospital* are shown, with an interesting commentary by the chairman of the judges. The contestants have demonstrated their awareness of "warmly human" and social values and have given great consideration to planning buildings that are homes rather than institutions. Their designs are undeniably artistic, elaborate in the inclusion of all possible service, and costly. To build such homes would undoubtedly require large federal or state grants. To live in and enjoy them would require increased incomes of elderly people, provided by increased pensions or pensions augmented by greater social security benefits.

The appendices provide interesting data on population figures, statistics on income of persons sixty-five years and over, estimates of building cost on a per bed basis, and bibliography.

The book makes a strong plea to planners of homes for the aged to employ an architect whose fee "might be much smaller than the savings benefits in cost of construction." This is a new field for architects, and in spite of the hard work involved in research, good thinking, and planning, it is an opportunity for them to make a valuable contribution to the welfare and happiness of older people.

The text is well organized and readable. The editors are to be commended for the efforts that have gone into the preparation of this book to add to the meager literature on the subject.—*Myrtle Van Horne, Project Director, Food Service Supervisors' Program, The American Dietetic Association, Chicago.*

RECENT BOOK RECEIVED

Food for Survival after a Disaster. By R. C. Hutchinson. New York: American Branch, Cambridge University Press, 1959. Cloth. Pp. 90. Price $2.75.

PROTEIN

essential in the daily diet

With other nutrients, protein must be supplied daily by foods of animal and plant origin . . . in kinds and amounts to satisfy the needs for essential amino acids and total nitrogen.

The amount of each essential amino acid which must be present in the diet varies with the individual's size . . . rate of growth . . . rate of maturation of tissues . . . efficiency of digestion and metabolism . . . physiological state . . . and health. Nature of the diet also affects amino acid requirements . . . total nitrogen and calories present . . . ratio of each essential and related amino acid to each other . . . times of eating and digestibility of foods which provide them . . . and adequacy of all essential nutrients.

Tentative ratios of amino acids required by human beings have been proposed . . . based on averages from many types of dietary studies. When these are compared with whole milk and eggs, it is found that . . .

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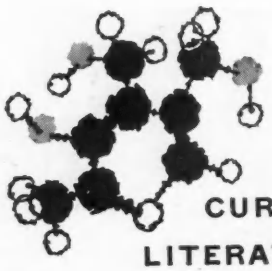


CURRENT LITERATURE

Contributed by Janette C. Carlsen, The Johns Hopkins Hospital, Baltimore; Clara Karl Frederick, University of Chicago Clinics; Elizabeth H. Tuft, Chicago Wesley Memorial Hospital; and the Journal staff.

ACTA ALLERGOLOGICA

Vol. 14, Fasc. 3-4, 1959

*Some psychological aspects of the treatment of food allergy in children. W. Kaufman. —p. 185.

Psychologic Aspects of Treating Food Allergy in Children. Certain normal and abnormal patterns of emotional reactions which may develop when allergenic foods are eliminated from a child's diet are discussed. Normal emotional reactions include four sequential stages which tend to merge into one another: (a) resistance, (b) tentative acceptance, (c) reality testing, and (d) complete or substantial compliance. More serious reactions include: (a) denial of food-induced allergic illness, (b) denial of identification with an allergenic parent, (c) withdrawal from reality, (d) depression, (e) anxiety, (f) phobias, (g) hypochondriasis (h) self-inflicted, food-induced allergic illness, and (i) asocial behavior, including delinquency. Parents are taught that a continuously firm but kindly attitude in dealing with the child's problems is most helpful.

ACTA SOCIETATIS MEDICORUM UPSALIENSIS

Vol. 64, No. 3-4, 1959

*Gas-liquid chromatography of human lymph fatty acids after feeding C^{14}-labelled fats. R. Blomstrand and O. Dahlback.—p. 177.

Fatty Acids in Human Lymph Lipids. The metabolic relationships among the individual fatty acids during the process of intestinal absorption in the human being can be studied with C^{14}-labeled dietary fatty acids and sampling of lipids of the thoracic duct. This report describes the first human study. Dietary stearic and linoleic acids are transported mainly as such incorporated into the lymph triglycerides. The predominant ester pattern of the lymph lecithins was shown. Linoleic acid was mainly incorporated into the alpha position and stearic acid mainly in the beta-ester group of the lymph lecithins.

THE AMERICAN JOURNAL OF DIGESTIVE DISEASES

Vol. 4, November, 1959

*Management of peptic ulcer: Clinical appraisal of therapeutic measures. C. Caravati.—p. 959.

Management of Peptic Ulcer. The most serious mistake in the management of patients with peptic ulcer is to employ a fixed and rigid pattern of therapy. No presently known therapeutic regimen will effectively prevent recurrences. Relief and healing of the peptic lesions may occur spontaneously, but a program which includes an adequate diet, intermediate feedings, proper antacids and anticholinergics, and a desirable doctor-patient relationship will usually result in a satisfactory response. Intragastric drips, hormones, cabbage juice, amino acids, histidine, Exul, and tissue extracts have little or no value. While results of recognized surgical procedures cannot be predicted, surgery should not be denied good risk patients with truly intractable ulcers. It is in this group that best results are experienced. Tobacco, alcohol, and caffeine are probably not ulcerogenic and may have no appreciable effect on the healing of an ulcer. However, there is some clinical evidence to suggest that continued smoking will result in the recurrence rate of benign peptic ulcer.

THE AMERICAN JOURNAL OF NURSING

Vol. 59, December 1959

*Obesity: Causes and treatment. J. Mayer.—p. 1732.

Obesity. Dr. Mayer discusses various aspects of obesity, including causes and treatment. He traces obesity to three sources: heredity, injury or trauma, and unfavorable external factors relating to nutrition or exercise. Living under modern conditions without developing obesity implies, for many of us, either that we will have to work consciously at stepping up our activity or that we will have to endure mild or acute hunger all of our lives. Sound advice on desirable weight loss is given. Dr. Mayer feels it undesirable as a rule to attempt to reduce weight by dietary restriction in children or pregnant women. A better solution consists in manipulating the diet and the schedule of exercise to keep the child's weight at its existing value and let the child "grow up" to the weight. Similarly, in pregnant women, postpartum weight loss can be used to achieve at least part of the desired result.

ANNALS OF BIOCHEMISTRY AND EXPERIMENTAL MEDICINE (India)

Vol. 19, August, 1959

*Distribution of phospholipids and cholesterol in normal human beings. V. S. Patil, M. H. Jattani, and N. G. Magar.—p. 183.

An improved method for the determination of uric acid in insect infested foodstuffs. S. V. Rao, K. Krishnamurthy, M. Swaminathan, and V. Subrahmanyan.—p. 187.

*Studies on ascorbic acid in bitter gourd and cauliflower. C. P. Tewari.—p. 191.

Phospholipids and Cholesterol. In this study, the distribution of serum phospholipids and the cholesterol level of Indians of different age groups was investigated. The values for the ester, free and total cholesterol, total phospholipids, lecithin, and sphingomyelin significantly increased in the age group fifty to sixty as compared with those of the thirty-to-forty age group. Increase in cholesterol with rising age was manifested by the ester fraction of the cholesterol. The phospholipids in human sera were mainly choline-containing lecithin and sphingomyelin. The effect of age on cephalin content was not observed.

Ascorbic Acid in Bitter Gourd and Cauliflower. This report relates to a detailed study of the effect on the ascorbic acid content of bitter gourd and cauliflower of various conditions of cooking and storage. After storage, these vegetables suffered a greater loss of ascorbic acid than the fresh vegetables on boiling. Dehydroascorbic acid and diketogulonic acid, which are more heat-labile than ascorbic acid, are formed during storage in the bitter gourd. In cauliflower, however, these products were formed only when the frozen vegetable was thawed. It is apparent that other factors may be responsible for the loss of ascorbic acid on boiling stored vegetables.

ANNALS OF INTERNAL MEDICINE

Vol. 51, November, 1959

Effects of long-term estrogen therapy on serum cholesterol and phospholipids in men with myocardial infarction. J. Marmorston, F. J. Moore, O. Magidson, O. Kuzma, and J. J. Lewis.—p. 972.

Newer physiology of absorption from the intestine. R. J. Reitemeier.—p. 993.

Changing concepts of the pathogenesis of Wilson's disease. Editorial.—p. 1110.

ARCHIVES OF INTERNAL MEDICINE

Vol. 104, November, 1959

In praise of Darwin. W. B. Bean.—p. 827.

The rheumatoid factors. H. G. Kunkel.—p. 832..

Vol. 104, December, 1959

Diet and coronary heart disease. G. V. Mann. —p. 921.

*The problem of gastric ulcer. J. B. Kirsner, C. B. Clayman, and W. L. Palmer.—p. 995.

Gastric Ulcer. Gastric ulcer is not exclusively a surgical problem. Adequate medical management achieves good immediate and favorable long-term results in 50 per cent or more of patients. The adjunct use of mild gastric irradiation appears to further increase favorable response. Surgical treatment, preferably gastric resection, is required when medical management is not effective or malignancy cannot be excluded. The mortality of this operation is relatively low, but the physiologic and nutritional consequences are not inconsequential.

BRITISH MEDICAL JOURNAL

No. 5161, December 5, 1959

*Breast or bottle?—p. 1239.

Breast or Bottle? British and Swedish workers have established

normal standards for total serum protein, albumin, and globulin for the first eighteen months of life. They found these values are unaffected by the type of feeding, i.e., breast milk or formula. Both British and Swedish investigators emphasize that their results do not detract from the recognized value of breast-feeding, which lies in the establishment of the natural emotional relationship between mother and child. Most of the other conjectural advantages of breast-feeding which formerly were confidently advanced have now been removed by scientific inquiry. Even in the advancement of psychologic reasons for breast-feeding, it is well for the evangelist to proceed with patience and understanding. The mother who is unable to breast feed her baby must have no feeling that she is doing either physical or psychologic harm if she uses the bottle.

CANADIAN JOURNAL OF PUBLIC HEALTH

Vol. 50, December, 1959

*Staphylococci in cheese: Some public health aspects. F. S. Thatcher, R. D. Comtois, D. Ross, and I. E. Erdman.—p. 497.

Staphylococci in Cheese. Staphylococci with phage patterns of strains commonly associated with cattle and with human infections are widely distributed, often in large numbers, in Canadian cheese made from unpasteurized milk. Mammary infection of cattle is considered to be contributory. Enterotoxin was demonstrated in 8 of 149 specimens tested from individual vats of cheese from a single factory selected because its product was highly contaminated with staphylococci. The toxic cheeses contained up to 1,500,000 staphylococci per gram. No staphylococci were found among 236 specimens of imported cheese, for the most part made from pasteurized milk, or heat-processed after manufacture.

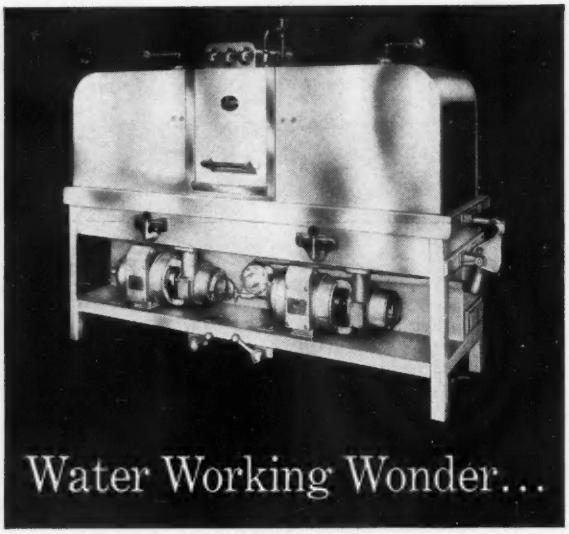
CEREAL CHEMISTRY

Vol. 36, November 1959

*Effects of the water-soluble constituents of wheat flour on cookie diameter. W. F. Sollars.—p. 498.

*The effect of lysine supplementation on the protein efficiency of high-protein breads. J. W. Brown, N. W. Flodin, E. H. Gray, and O. E. Paynter.—p. 545.

Water Solubles and Cookie Diameter. The fraction of water-solubles in wheat flour that contained the low-molecular substances had negligible effects on cookie diameter, although this fraction contained most of the original water-solubles, most of the hexose material, and much of the nitrogenous matter, but little of the pentose material. The water-soluble proteins from the high-molecular fraction had small effects on cookie diameter, but the water-soluble polysaccharides from this fraction greatly reduced the diameter. Most of the reduction of cookie diameter was due to the polysaccharides with high pentose content.



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Lysine Supplementation of Bread. Rat-growth studies were carried out with diets of various breads, with and without lysine supplementation. The protein quality, as measured by the protein efficiency ratio, was found to be a direct function of the lysine content of the mixed protein, regardless of whether the lysine was a constituent of protein or was added as L-lysine monohydrochloride. For protein efficiency ratios in the high-quality range of 2 or higher, it appears necessary that the bread protein contain at least 200 mg. L-lysine per gram nitrogen.

FOOD AND NUTRITION NOTES AND REVIEWS

Vol. 16, July and August, 1959

*Infant and maternal welfare nurses, and applied nutrition in the South Pacific Islands. S. Malcolm.—p. 65.

Infant and Maternal Welfare in the South Pacific. A nutritionist of the South Pacific Commission discusses a program for welfare nurses to improve infant and maternal welfare in the South Pacific. The author stresses that it is essential for a nurse to learn intimately the customs existing in a community if she is a stranger to the area. She must take these customs as starting points and alter them or introduce new ones only after considerable thought. It is most important that she have the ability to modify her theoretical training and use practical demonstration whenever possible. Customs relating to food intake and breast-feeding, food production, and crops are also discussed.

INDUSTRIAL MEDICINE AND SURGERY

Vol. 28, December, 1959

Malt beverages as supplements to approved diets. C. E. Dutchess.—p. 544.

JAPANESE SOCIETY OF INTERNAL MEDICINE

Abstracts of papers of the 55th scientific sessions, May 2-4, 1958

*Reappraisal on the high-carbohydrate and low-fat diet used in dietary treatment of diabetes mellitus patients and the significance of protein. T. Saito.—p. 82.

*Obesity and arteriosclerosis in Japan. S. Matsuki, H. Sekiya, Y. Ozawa, K. Kataoka, T. Yoda, Y. Shichiri, K. Ito, K. Okubo, and K. Sasaki.—p. 183.

*On food-poisoning "Botulism (type E)" which occurred in a group of people. K. Mitsugi and E. Kodama.—p. 202.

A High-Carbohydrate, Low-Fat Diabetic Diet. This paper is a reappraisal of the high-carbohydrate, low-fat diet for diabetic patients proposed in 1936 and in use since then in a clinic in Japan. Such a diet, for example, might contain 1800 calories with 300 gm. carbohydrate, 70 gm. protein, and 30 gm. fat. In treating patients needing only diet therapy, the superiority of this high-carbohydrate, low-fat diet was fully demonstrated. In patients requiring insulin, it was usually superior, but in some instances a low-carbohydrate (150 gm.), high-fat (96

gm.) diet showed better results. Protein in the amount allowed in the current systems of dietetics seems to have little effect on the carbohydrate metabolism.

Obesity and Arteriosclerosis in Japan. In this study of 492 Japanese men, ages forty to sixty-nine years, admitted to a Japanese hospital for a check-up, 182 were obese. There was a higher percentage of diabetes, hypertension, and myocardial damage in the obese men than in those of normal weight. This study showed that with Japanese, as with Americans, obesity may contribute to the appearance of the diseases closely related to arteriosclerosis, such as diabetes, hypertension, myocardial damage, and retinal arteriosclerosis. The obesity itself may be more remarkably responsible than the complication of arteriosclerosis and for the increases of serum cholesterol, cholesterol:phospholipid ratio, and lipoprotein index.

Botulism Type E. A report is given of botulism food poisoning which occurred in Japan from a vinegared fish and rice dish. *Clostridium botulinum* type E was found. Though the mortality from botulism is usually high, all nine cases reported here recovered.

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 171, December 5, 1959

*Glycogen metabolism. Editorial.—p. 1966.

Vol. 171, December 12, 1959

*Water softeners and low-sodium diet. Questions and Answers.—p. 2154.

Vol. 171, December 26, 1959

*Shortage of dietitians. Foreign Letters—United Kingdom.—p. 2354.

*Time of serving main meal. Questions and Answers.—p. 2372.

Glycogen Metabolism. Concepts of the enzymatic reactions responsible for the biosynthesis of polysaccharides have been completely changed in the past decade as a result of the discovery of uridine nucleotides. According to recent reports, uridine diphosphate glucose is the key intermediate in the synthesis of glycogen. Like other nucleotides, it serves a dual role, appearing as a component of ribonucleic acid and as a nucleotide to form a coenzyme involved in biosynthetic reactions. The discovery of the role of uridine diphosphate glucose in glycogen synthesis opens new avenues for the study of carbohydrate metabolism.

Water Softeners and Low-Sodium Diet. In some areas, water contains in its natural composition sodium chloride in excess of the desired amount for hypertensive patients. The content of sodium in artificially softened water depends on the method of softening used. Large municipalities use the soda-lime type or some modification thereof, and the water is substantially free of sodium. Water treated to "zero" softness is unpalatable, and to overcome this, natural water is often added. Smaller city

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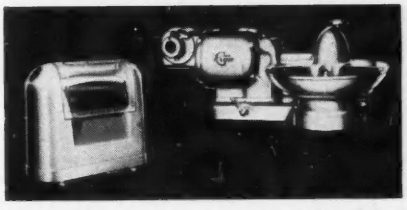

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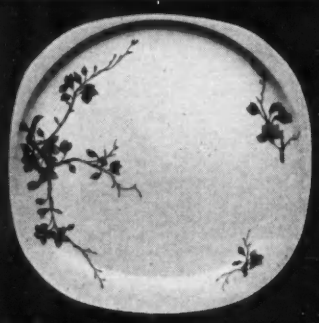

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and home units use a method of water softening predicated on ion-exchange (zeolite method). This water has a substantial sodium content, and the harder the natural water, the higher the sodium content.

Shortage of Dietitians. The British Dietetic Association has set up a fact-finding committee of members to inquire into the shortage of dietitians, particularly in the National Health Service. Information revealed that in 100 groups of hospitals, no dietitians were employed, and in 314 hospital groups with 391 positions available, only 279 were filled. As the number of students qualifying each year as dietitians is about 45, the shortage is likely to continue.

Time of Serving Main Meal. Assuming that nutritional lipemia or hyperlipemia increases the blood coagulability and that rest and not physical stress predisposes to coronary and cerebral thrombotic accidents, the question is asked whether it would be wiser to have the main (richer in fat) meal at noon rather than in the evening. This consultant feels that increased coagulability due to hyperlipemia is questionable, and also that physical activity performed just after a meal may be dangerous for the person with narrowed coronary arteries. It would seem best to reduce the saturated fat portion of the meals for persons who have elevated serum lipid levels.

THE JOURNAL OF THE CANADIAN DIETETIC ASSOCIATION

Vol. 21, November, 1959

*The philosophy of dietary standards (with particular reference to the adult requirements for energy and protein). E. W. Crampton.—p. 234.

Dietary Standards. The philosophy of dietary standards in general and of the Canadian standard in particular is discussed. Emphasis is given to the adult requirements for energy and protein. Some of the reasons why comparable values found in nutrient standards differ are considered. Nevertheless, some day we may get all comparable standards to agree.

JOURNAL OF HOME ECONOMICS

Vol. 51, December, 1959

*Effects of blanching, freezing, freezing-storage, and cooking on ascorbic acid retention in vegetables. J. Gordon and I. Noble.—p. 867.

Ascorbic Acid Retention in Vegetables. The effects of the various steps in home-processing of frozen vegetables (blanching, freezing, frozen-storage) and of cooking on ascorbic acid retention were studied. The pattern of retention of ascorbic acid varied from vegetable to vegetable, but in each, the combined effects of the various steps were such that the percentages of ascorbic acid originally present in the raw vegetable which were retained in the cooked frozen-stored samples were significantly smaller than those in the cooked fresh vegetables. The various processing steps seemed to have no effect on the susceptibility of the majority of vegetables to losses of ascorbic acid during cooking.

JOURNAL OF THE INDIAN MEDICAL ASSOCIATION

Vol. 33, October 16, 1959

*Dietary fats, serum cholesterol and serum lipid phosphorus in different socio-economic groups in Uttar Pradesh. K. S. Mathur, P. N. Wahi, and K. K. Malhotra. p. 303.

*Biological value of proteins of some food materials. S. P. Roychowdhury.—p. 33

Fats, Cholesterol, and Lipid Phosphorus. A study of dietary habits of different socio-economic groups was conducted in Uttar Pradesh, a section of India. The highest socio-economic group consumed the highest amount of dietary fat, derived the highest percentage of calories from fats, and most of the dietary fat was saturated. The highest mean readings of serum lipids were observed in the highest socio-economic group, and the lowest in the lowest one. The dietary and serum lipid patterns in the middle socio-economic group fell between the highest and the lowest groups. The total serum cholesterol showed no progressive and consistent rise with increased intake of dietary fat.

Proteins of Some Food Materials. The average diet of an Indian is lopsided, primarily because it lacks proteins of good quality, and whatever is available is mostly of vegetable origin. In the search for newer food materials and the suitable mixtures, this study indicates that milo flour may constitute a self-sufficient food material and that perhaps it would be better to supplement wheat flour at 5 per cent level of milo flour. Bamboo seeds appear to be worth trying on a large scale basis. Roasted and powdered Bengal gram, barley, and maize appear to have proteins of good nutritive value.

THE JOURNAL OF NUTRITION

Vol. 69, December, 1959

*Modifications of diets responsible for induction of coronary thromboses and myocardial infarcts in rats. W. A. Thomas, W. S. Hartroft, and R. M. O'Neal.—p. 325.

*All-vegetable protein mixtures for human feeding. II. The nutritive value of corn, sorghum, rice and buckwheat, substituted for lime-treated corn in Incap Vegetable Mixture Eight. R. Bressani, A. Aguirre, and N. S. Scrimshaw.—p. 351.

*Relation of dietary fat and supplementary riboflavin to tissue levels of cholesterol, riboflavin and total lipids in the rat. I. Harrill, A. M. Kylen, A. Weis, and E. Dyar.—p. 356.

The use of casual urine specimens in the evaluation of the excretion rates of thiamine, riboflavin and N^1-methylnicotinamide. I. C. Plough and C. F. Consolazio.—p. 365.

*Effect of dietary fats and carbohydrates on digestibility of nitrogen and energy supply, and on growth, body composition and serum cholesterol of rats. M. W. Marshall, H. E. Hildebrand, J. L. Dupont, and M. Womack.—p. 371.

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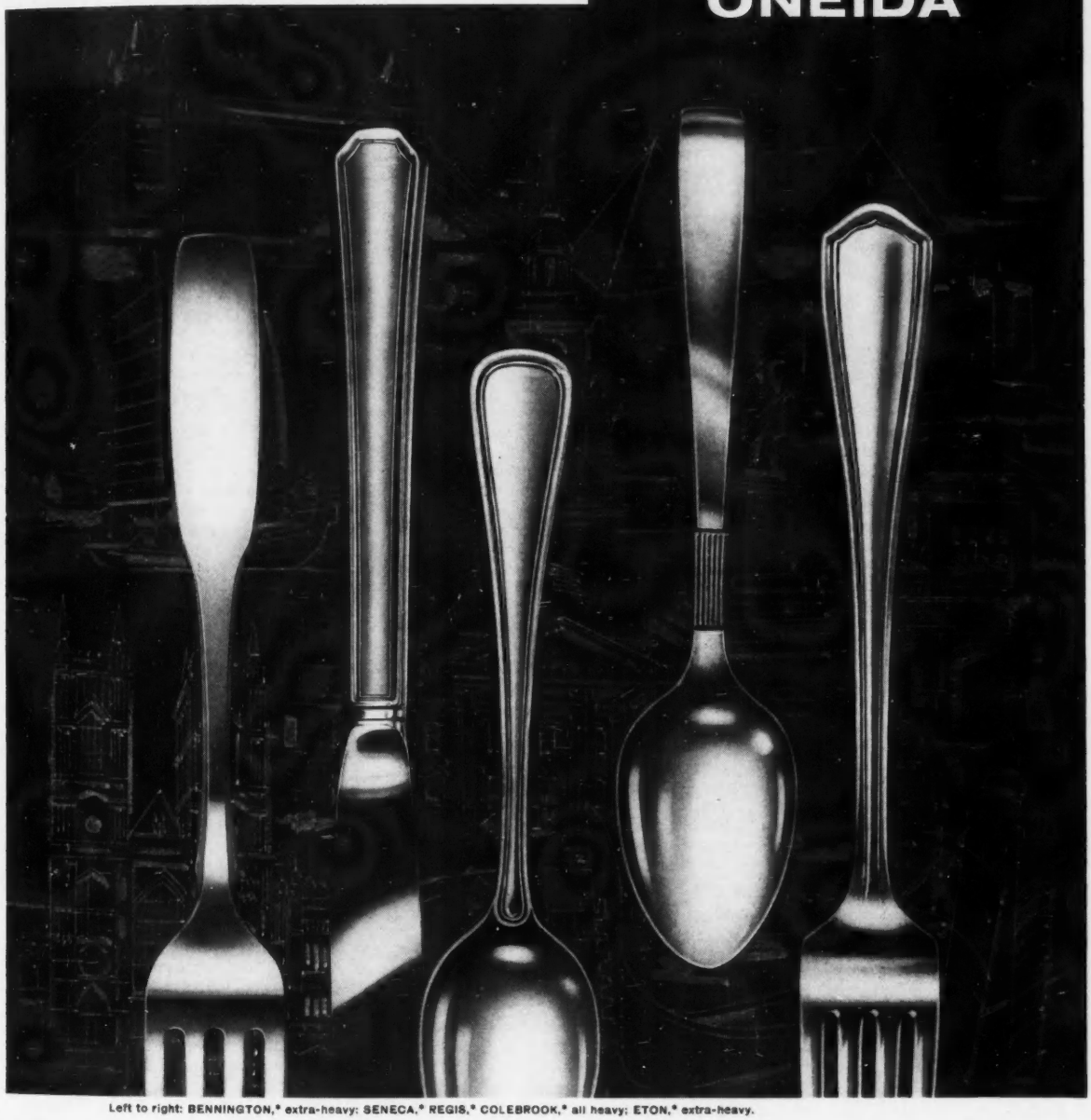

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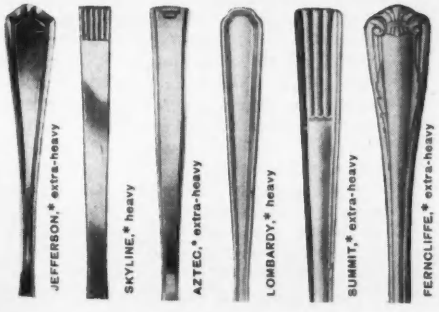

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Thrombosis in Rats. The dietary production of experimental arterial thrombosis, with resultant myocardial and renal infarction, has been accomplished in six separate experiments on rats. In each experiment, approximately one-fifth of the animals on the "basal thrombogenic diet" that survived two months developed infarcts. The important ingredients of this diet appear to be fat, cholesterol, choline chloride, propylthiouracil, and bile salts, although no single one of these supplements has proved sufficient alone to produce infarcts. However, omission of any of these important ingredients lowered the incidence of infarcts.

Vegetable Protein Mixtures. An all-vegetable protein mixture for the supplementary and mixed feeding of young children, designated INCAP (Institute of Nutrition of Central America and Panama) Vegetable Mixture 8, contains corn masa, sesame flour, cottonseed flour, torula yeast, and kikuyu leaf meal. Production of corn in Latin America is below the level needed; hence, substitutes are becoming important. The results of this study indicate that any of the four cereals tested—ground yellow corn, buckwheat, sorghum, or rice—could be substituted for all or part of the masa flour (from lime-treated corn) in this Mixture 8 if factors of economy and agriculture make this desirable.

Cholesterol and Riboflavin in Tissue. The effect of varying levels of dietary fat and riboflavin on the concentration of cholesterol, riboflavin-containing coenzymes, and total lipids in tissues of the rat was studied. Rats fed a ration containing 20 per cent fat and varying levels of riboflavin had a higher concentration of cholesterol in liver than did corresponding animals fed a ration containing 5 per cent fat. An increase of supplementary riboflavin decreased the deposition of cholesterol in liver for rats on 20 per cent fat. The level of dietary fat had no effect on serum cholesterol which increased with increased riboflavin intake at both fat levels. Total lipids in liver decreased with increased riboflavin intake, but the differences were not significant.

Dietary Fat and Body Composition. In this study, the effect of dietary fats and carbohydrates on digestibility of nitrogen and energy supply, and on growth, body composition, and serum cholesterol of rats is discussed. Weight gains were correlated with apparent digestible energy intake, but not necessarily with fat intake. When animals with the same caloric intake were compared, regardless of kind or level of fat, those which received sucrose stored a higher per cent of their caloric intake as fat than those which received cornstarch. Digestibility of nitrogen supply and nitrogen retention expressed as per cent of nitrogen intake did not appear to be related to kind or amount of dietary fat. There was no correlation between per cent of body fat and serum cholesterol.

THE LANCET

No. 7108, November 21, 1959

*Nutrition and the clinician. J. F. Brock.—p. 859.

No. 7109, November 28, 1959

*Nutrition and the clinician. J. F. Brock.—p. 923.

*New sources of protein.—p. 956.

Nutrition and the Clinician. A clinician in two articles reviews the knowledge of the science of nutrition, mentioning those areas where investigation is needed. Orthodox medicine has neglected the role of dietetics in promoting health and preventing disease. In the face of cycles of enthusiasm for one or another cult of the "back to nature" food faddists, we have resolutely emphasized the adaptability of man to diet. Man is undoubtedly adaptable to a great variety of diets, but almost certainly he has paid the penalty for some of his adaptations. He paid the penalty of *Mehlnahrschaden* and of kwashiorkor for his adaptation to starchy cereals when he left a nomadic life for settled agriculture. He may have paid a further penalty of cirrhosis and primary cancer of the liver in middle age for the same adaptation. He has certainly paid the penalty of obesity, with its attendant discomforts and shortened life expectancy, for the diets of social privilege down the ages and for those of the recent era of plenty among the privileged nations. He may also be paying for these latter diets an added penalty of premature morbidity and mortality for ischemic heart disease. Perhaps the cult of moderation in eating may have material advantages in health and longevity which outweigh its alleged penalty of smugness. With the advances in clinical nutrition lurks the specter of overpopulation. Although rising standards of living eventually lead biologically to falling birth rates, there is little sign of this yet in under-developed countries—or in some privileged countries.

New Sources of Protein. Kwashiorkor, attributable to insufficiency of suitable dietary protein, is the most widespread and important deficiency disease in the world today. In countries where it is common, inadequate dietary protein can reasonably be supposed to cause widespread slowing of mental development. Many educators do not seem to have appreciated this. In prosperous countries, foods of animal origin normally supply a considerable proportion of the dietary protein. This procedure is effective although inefficient, for total nutrients, including protein, that become available to man from land used for pasture are much less than would be available from the same land under the plow. Additional protein sources must be found from vegetables, especially for communities whose staple food is either a cereal or a starchy root. It has been proved that suitable mixtures of vegetables will provide proteins that promote and maintain growth. Soybeans

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are rich in protein and have been used by the Chinese for generations, but they have never become popular with either agriculturists or consumers elsewhere. More revolutionary is the demonstration that leaves can provide valuable proteins. Leaf protein may become a major weapon against kwashiorkor. The raw material is readily available in most parts of the world, and cultivation costs nothing. The setting up of small extraction plants locally shall not prove either difficult or expensive. The real problem is likely to be in persuading mothers of the value of a new and strange food for their children.

NEW YORK STATE JOURNAL OF MEDICINE

Vol. 59, November 15, 1959
*Medical management of recurrent urinary calculi. D. F. McDonald.—p. 4212.
Vol. 59, December 1, 1959
*Physiology of appetite and hunger. J. H. Fryer.—p. 4418.

Recurrent Urinary Calculi. Eighty-nine per cent of recurrent calculi contain calcium. Over half of these are mixtures of calcium, ammonium, and magnesium phosphates and carbonates; the remainder contain oxalate as an anion. Management of the mixed calcium stones is directed toward reducing the calcium of the urine by dietary restriction and reducing calcium absorption with sodium acid phosphate or sodium phytate. Acidification of the urine to *p*H 5 doubles the solubility of calcium phosphate at neutrality. For calcium oxalate calculi, acidification is ineffective. A low-calcium and -oxalate diet and calcium binders may be helpful. Uric acid calculi are due to hyperuricaciduria of the gouty diathesis. The classical prophylactic diet avoids foods rich in nucleoproteins. But a low-protein diet (1 gm. per kilogram) with alkalinizers to make the urine *p*H 7 or greater reduces uric acid excretion and increases its solubility. No dietary restriction helps patients with cystinuria.

Physiology of Appetite and Hunger. Whether investigations into the physiology of appetite and hunger will ultimately bear on problems of health in the human-being is uncertain. The relative overeating which causes active obesity is certainly associated with a failure of any homeostatic mechanisms which may exist. This may reflect the weakness of such mechanisms in the face of overriding control from higher centers, that is, those of so-called psychologic origin. There is more evidence for this hypothesis than one dependent entirely on an organic disturbance of a basic physiologic mechanism, but the truth probably lies between the two. Further basic research, probably by the neurophysiologists, is needed. We may discover enough about the process to allow us to control the satiety mechanism by chemical or other therapy and thus prevent or correct obesity, although such a possibility is not in sight at the moment. A general discussion of the experimentation on hunger and appetite is included.

NUTRITION REVIEWS

Vol. 17, December, 1959
*Food faddism. R. W. Engel.—p. 353.
Vol. 18, January, 1960
*The Food and Drug Administration faces new responsibilities. P. L. Day.—p. 1.

Food Faddism. This author stresses that all nutritionists should be alert to the ever-increasing volume of nutrition information disseminated by the quack or faddist. Dissemination of the truth through more vigorous youth education and extension of adult education programs would appear to be the most effective remedy for counteracting the impact of the faddist. Equally important is that of improving the standards in the practice of clinical nutrition by physicians. Steps taken by nutritionists in nutrition education to combat food fads are discussed.

The Food and Drug Administration. The various functions of the Food and Drug Administration, with emphasis on the new responsibilities, are discussed by the Food and Drug Administration Scientific Director. He laments the fact that the federal government spends less than 7 cents per person each year for protection of foods, drugs, and cosmetics against adulteration, misbranding, filth, and decomposition; protection against dangerous drugs and cosmetics and the hazards of pesticide residues and radioactivity; as well as other research activities of the Food and Drug Administration.

PUBLIC HEALTH REPORTS

Vol. 74, December, 1959
*Diet care and services for patients with cardiovascular disease. B. Heap.—p. 1086.
*Chlorinated organic pesticide residues in fluid milk. P. A. Clifford, J. L. Bassen, and P. A. Mills.—p. 1109.

Dietary Care and Services. A nutritionist of the Heart Division of the Public Health Service briefly discusses diet therapy in cardiovascular disease. She emphasizes that one of the biggest blocks to a successful dietary regimen is the patient's lack of sufficient instructions when the diet is prescribed. The majority of patients on prescribed diets lack the adequate counseling services which they should have. The average person does not have sufficient knowledge to fulfill accurately the requirements of most dietary prescriptions. A practical solution would be a cooperative community service designed to serve all patients on their physician's referral and to anyone requesting nutritional information. Several basic food guides are suggested for patient education.

Pesticide Residues. In a 1958 survey conducted by the Food and Drug Administration, 936 samples of raw milk from forty-eight dairies in sixteen metropolitan areas in all sections of the U.S. were analyzed for residues of chlorinated organic pesticides by a

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paper chromatographic method. Twenty-three samples showed residues of 0.1 p.p.m. or more. Of the 936 samples, 168 were further examined and 3 per cent showed significant residues. Where the bio-assay procedure was used, 33 per cent of the 1958 samples gave a positive test for chlorinated organic pesticide residues, as compared with 62 per cent in the 1955 survey.

ROYAL SOCIETY FOR THE PROMOTION OF HEALTH JOURNAL

Vol. 79, November-December, 1959

*Radioactive contamination of food. W. Anderson.—p. 721.

Radioactive Contamination of Food. Predictions of future levels of the long-lived contaminants in food, in relation to given rates of fallout, can apparently be made with some degree of confidence. However, it appears important that direct measurements on foods should be continued until some of the areas of uncertainty about fallout mechanisms are removed. In this paper, attention is given to the radionuclides which, by virtue of their physical and chemical properties, might be expected to contribute significantly to the radioactivity of the body; and the results of recent measurements in this field are outlined.

THE SANITARIAN

Vol. 22, November-December, 1959

*Safe water around the world. F. F. Aldridge.—p. 136.

World Sanitation. It has been estimated that over half of the world's population drinks unsafe water, disposes of human waste recklessly, prepares food carelessly, and is plagued by disease-transmitting insects. The author reviews some of the environmental sanitation programs of the past decade and discusses the rural vs. the urban approach. The key criteria for launching a program which will bring earlier sanitary accomplishments and provide a foundation for the long-range objective of improving man's environment throughout the world are noted. Community water supply programs and the proposed global water supply program of the World Health Organization are also discussed.

SCIENCE

Vol. 130, December 18, 1959

*Effect of soil nutrients on plant uptake of fallout. E. B. Fowler and C. W. Christenson.—p. 1689.

*Fat and growth during childhood. S. M. Garn and J. A. Haskell.—p. 1711.

Vol. 131, January 1, 1960

*Degree of obesity and serum cholesterol level. C. B. Thomas and S. M. Garn.—p. 42.

Soil Nutrients and Plant Uptake of Fallout. These authors report the effect of soil nutrients on plant uptake of fallout. The absorption of strontium-90 by lettuce, grass, and alfalfa was found to be progressively inhibited by increasing concentrations of soil calcium. The discrimination noted against strontium (up to 2.8) depended on the concentration of soil calcium. Cesium-137 was removed by plants from soil to a lesser degree than strontium-90. It is thought that cesium is bound by the soil, and hence is less available to the plant. The depth of feeding of the plant is an important factor in the natural absorption from the soil of radionuclides arising from fallout.

Fat and Growth During Childhood. In the study described here, fat thickness, size, and maturity status were significantly correlated from one and one-half through eleven and one-half years in both sexes. Children who are fatter than their contemporaries at eight and one-half to nine and one-half years reach menarche earlier and complete epiphysial union sooner.

Degree of Obesity and Serum Cholesterol. Among the variables thought to affect serum cholesterol levels in normal subjects, the degree of obesity has been of particular interest because the amount of stored fat is accessible to dietary control. In the study reported here, no significant correlation was found between the serum cholesterol level and weight (weight corrected for frame size), or thickness of the fat shadow in healthy young medical students.

AMERICAN RESTAURANT

Vol. 43, December, 1959

*For large groups . . . buffet style service takes minimum space, less employees, least serving time. C. E. Blackburne.—p. 36.

*Lamb for better quantity feeding.—p. 52.

*Inventory and storage of meats, fruits, vegetables. T. Greer.—p. 86.

Vol. 44, January, 1960

*7 responsibilities in establishing restaurant labor relations. W. J. MacReynolds.—p. 28.

*Soufflés can be simple. C. E. Blackburne.—p. 44.

Buffet Style Service. The advantages of the four main types of buffet-style service are discussed. A detailed account of menu suggestions for each type is given which includes a list of dishes, attractive table settings, directions for preparing some of the items, and instructions on how to use some foods decoratively.

Economize with Lamb. Quality lamb is certain to be a guest-pleaser in almost any type of food operation, and there is a lamb cut to serve all menu needs. This article deals with factors influencing the selection of lamb, brands and grades, the best buys, and the portion cuts available in variety for cost control.

Inventory and Storage. In this second of four articles on handling foods in a twenty-one day menu cycle, detailed directions are given for the optimal storage of fresh meats, fruits, and vegetables. Each category and type of food is discussed separately.

Labor Relations. Although the relationship of the restaurant owner and a union is important, good or bad

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1. Macy, I. G.; Kelly, H. J., and Sloan, R. E.: With the Consultation of the Committee on Maternal and Child Feeding of the Food and Nutrition Board, National Research Council: The Composition of Milks, National Academy of Sciences, National Research Council, Publication 254, Revised 1953. 2. Brown, G. W.; Tuholski, J. M.; Sauer, L. W.; Minsk, L. D., and Rosenstern, I.: Evaluation of Prepared Milks in Infant Nutrition, Use of the Latin Square Technique. To be published.

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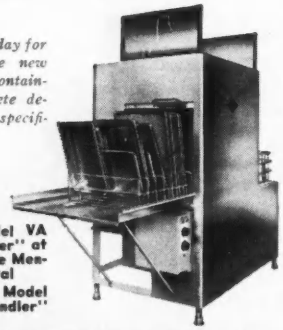

TOP—Model VA "Panhandler" at large State Mental Hospital
RIGHT — Model SA "Panhandler"

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Representatives—Coast to Coast

labor relations depend primarily on the relationship between the owner and the employees. The author elaborates on what he feels are the seven most important labor relations responsibilities of an owner with regard to his employees. He also stresses that, "Since most grievances arise out of employees' complaints, the surest way of keeping the number of grievances to a minimum is for Management to think beforehand, about what employee reaction will be to any action he is considering taking."

Tricks for Soufflés. While soufflés are usually served as a dessert, they offer great appeal as a main course, especially when made with vegetables and cheese. Just how difficult is a soufflé to prepare? Not difficult at all, answers the author, if one understands the basic idea and works carefully. He explains some of the tricks for preparing them and gives seven recipes to show the variety of ingredients which may be used.

COLLEGE AND UNIVERSITY BUSINESS

Vol. 27, December, 1959

*A purchasing agent's view on food procurement. R. S. Mullen.—p. 55.

*You can take the monotony out of dormitory dining. M. Wilson.—p. 58.

Vol. 28, January, 1960

*A purchasing agent's views on food procurement. R. S. Mullen.—p. 46.

*Putting imagination into the menu. M. A. Warner.—p. 48.

A Purchasing Agent Views Food Buying. Food procurement can be efficiently handled by either the director of the dining halls or by the purchasing agent, but if it is the purchasing agent's responsibility, there must be close cooperation and coordination between them. "In working practice, the program must be carried out as a thoroughly blended responsibility." The author relates his opinions on what the general conceptual approaches to food purchasing should be and describes the operation of the eleven dining halls at Harvard University.

Be Gone, Dorm Meal Monotony. Dormitory dining rooms are places in which either to eat or to dine. Today's larger dining halls will just have to be accepted because building costs dictate their use, but this does not prevent opportunities to effectively merchandise the food served in these "feeding mills." Monotony starts at the dining room door, and the first impression a student receives of the menu board, for example, is significant. The author contributes many ideas for transforming dormitory eating into resident dining.

Food Procurement. In this concluding article of a series, the author comments on factors to be considered in purchasing canned goods, fresh fruits and vegetables, milk and cream, and ice cream.

Menu Imagination. There seems to be no end to the variations which can be created from "standard" and oft-times tiresome menu items if imagination and a bit of creative ability are given free reign. Pastas come in a multitude of shapes and sizes, and different forms will often accomplish the task of diverting the attention of the diner away from the fact that they are "filler" items. The author also advocates the return of meal-in-a-bowl soups to replace the monotony of the standard sandwich. Simplicity of preparation and no limits on the variety are two of the strongest assets of the Danish open-face or knife-and-fork type of sandwich.

DINER DRIVE-IN

Vol. 18, December, 1959

*How to reduce personnel turnover. D. E. Lundberg.—p. 20.

*Ways to figure depreciation.—p. 23.

Reducing Turnover. There are circumstances which may necessitate the use of a "gimmick" to induce employees to stay longer and be happier with their jobs. The author explores the problem of rapid employee turnover and offers several types of solutions.

Depreciation Calculations. The method chosen for determining depreciation can greatly affect annual profits. The approved methods, with examples of the tax and profit effects of each, are explained in this article.

FOOD SERVICE MAGAZINE

Vol. 21, December, 1959

*The problem of personnel.—p. 44.

Personnel Problems. The highlights of Michigan State University's nationwide study on the personnel practices in successful restaurants are noted. "Sound personnel policies and practices which lead to human efficiency and control of labor costs is the first need of management in the restaurant industry." Obtaining employees of satisfactory caliber was ranked as the number one problem, and motivating them to do a satisfactory job was the number two personnel problem, according to the survey.

HOSPITAL FORUM

Vol. 2, December, 1959

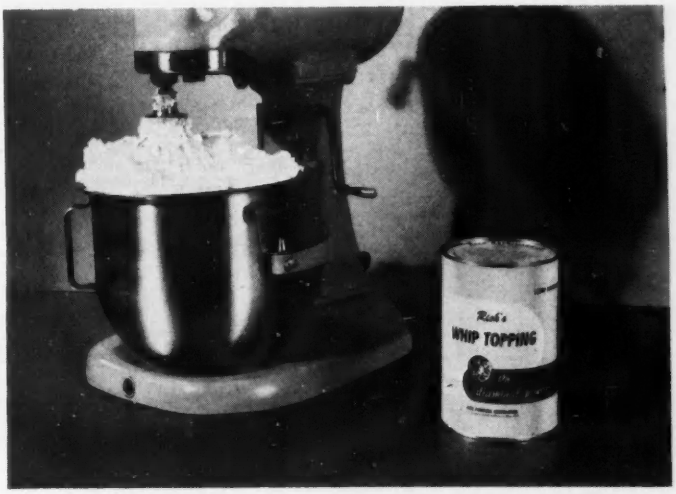
*Public relations and hospital food service. O. G. Haines.—p. 13.

*Setting the menu pattern. E. E. Starr.—p. 17.

*The public health nutritionist. J. C. Obert.—p. 25.

Food Service Public Relations. Communication between the top executives and each employee is essential, but cross communication at all levels is equally important. The author describes the working relationship which has been evolved in one situation between the hospital public and patient relations department and the dietary department. Suggestions are also presented for other inter-department communications which could prove to be an important key to stepped-up efficiency and vastly improved employee and patient relations.

Menu Patterns. Planning menus for an institution in which the same group is to be fed for a period of time pre-



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sents quite a challenge. "The ideal menu pattern takes advantage of savings available by repeating dishes while at the same time earning the praise of the patients for interest and variety." The author provides detailed information on how to set up a three-week meal pattern which will meet the requirements for proper nutrition and variety.

HOSPITAL MANAGEMENT

Vol. 89, January, 1960

*For appeite appeal use a colorful garnish.—p. 76.

Peachy Menu Ideas. Peaches, which are colorful, convenient, and nutritious, are also versatile. The author introduces a host of menu variations using the peach, as well as information on the grades which are packed for quantity users.

HOSPITALS

Vol. 34, January 1, 1960

*Three looks at hospital food service in the sixties. E. C. Downes, O. Webber, and A. E. Avery.—p. 66.

Triple Views and Forecasts. A dietitian predicts that hospital food service directors will be faced with a severe labor shortage in the next decade, but will be offered more and more convenience foods of high quality. Equipment will become more mobile, and electronics will invade the kitchen in ever-increasing degrees. A consultant-engineer forecasts that basic foods will be prepared and held in zero stores until time for reconstitution on the floors, a method which was just recently put into operation at the University of Miami. According to a food technologist, "Hospital food service in the next decade proposes to cut down labor and fill the gap with food service efficiency that combines scientific research and basic hospital requirements." He proposes that hospitals use frozen foods prepared in plastic or foil pouches which can be heated in the floor serving kitchen or on the serving cart.

INPLANT FOOD MANAGEMENT

Vol. 7, January, 1960

*Service and . . . self service methods of operation. D. C. Robertson, Jr.—p. 24.

*Personnel selection. E. V. Nemec.—p. 30.

*Plan safety as a part of the cafeteria. H. Zibble.—p. 33.

*Linen control. A. B. Dreissiger.—p. 34.

*Planning with a consultant. S. Keates.—p. 53.

*Planning equipment for the inplant cafeteria. Part I—Today's needs. B. Blickman.—p. 74.

*Planning equipment for the inplant cafeteria. Part II—Tomorrow's changes. C. T. Johnson.—p. 80.

Which of the Three? There seems to be no hard and fast rule for the type of food service best suited for industrial feeding. The author comments on the advantages and disadvantages of the three most common methods of operation: (a) cafeterias, snack bars, and carts; (b) service restaurants; and (c) vending machines.

Selecting Personnel. A cafeteria starts with the selection of personnel, no matter how automated it may be. This involves the determination of how many employees, what kind, what knowledge they should have, and how they should be trained. The author examines the factors which should be considered in each of these aspects of personnel selection.

Safety Programs. "The frequency of lost-time accidents has become a problem in many industries, and particularly in the food serving fields." Management has a large stake in the success of accident prevention campaigns—financially and in employee morale. Accidents occur because of unsafe actions and/or unsafe conditions. If management and employees can be convinced that accidents don't just happen, they can cooperate on a program aimed at these two causes of accidents. The author suggests key points to be considered in setting up a safety program, especially for the food service department.

Linens Are Important. The author reviews the reasons for using independent linen and uniform suppliers. He tells how the manager should go about getting the best possible service and how cooperative efforts can provide better linen service for the employees and patrons.

Consultant Services. During the early, and most important, stages of planning the inplant cafeteria kitchen facilities, consultants offer many varied services. Also, there are many operations presently in operation which are greatly in need of analysis for improvements. The valuable services rendered by the food facilities consultant are aimed at increasing efficiency and reducing operating costs. The author answers many of the typical questions which arise when planning with a consultant is being considered.

Planning Equipment for Today's Needs. With the average cost of a new food service facility almost double what it was five years ago, the planning of these facilities and equipment for efficient use is vital. The basic elements for this are listed and suggestions are provided for accurate and effective planning of the system, a blueprint trial, labor costs, and fabricating details.

Planning Equipment for Tomorrow's Changes. How much thought should be given to modular type of equipment is the question discussed by the author. In defining modular equipment, he considers the following components: (a) quantity production, (b) field tests, (c) flexibility, and (d) similarity of component parts. He also examines modular equipment with regards to planning for expansion.

THE MODERN HOSPITAL

Vol. 93, December, 1959

*Braising makes the most of low-cost meats. D. Zumsteg.—p. 120.

*We can build efficiency into the kitchen. E. Miller.—p. 124.

Braise a Menu Trail. There are a wide variety of meats which may be

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NEW 10E ELECTRIC ROASTER-BAKER

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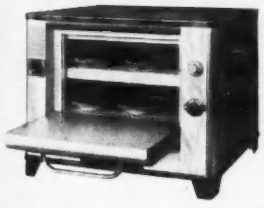
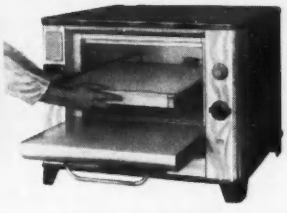
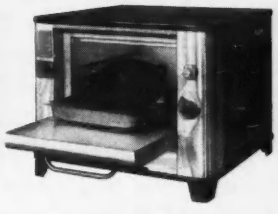


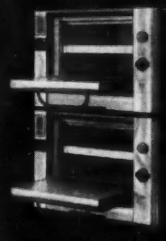
With center shelf in, unit provides two baking compartments, each 20"x20"x4". Three electric heating units in top, center shelf and bottom give intense heat, trigger-quick recovery.



Center shelf slides out easily. Two-in-one timer can be set for cooking cycles of 6 or 60 minutes.



With center shelf removed, unit provides single 20"x20"x10½" roasting compartment. With automatic temperature controls you dial the heat you want and the thermostat holds it.



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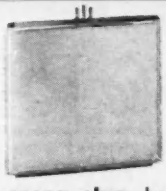

Three-prong plug, built into back of center shelf, plugs its heating element into the main electrical system when the shelf is in use.

In Canada: Garland Commercial Ranges, Ltd., 41 Medulla Ave., Toronto 18, Ont., Canada

advantageously prepared by braising. Added flavor, menu variation, and cost economy are a few of the merits of this method of cooking. Numerous techniques, a time table for braising meats, and a list of meat cuts suitable for braising are given.

Building in Efficiency. Attention to details, such as those discussed in this article, in planning food service equipment and related areas can make the food service department a more convenient and productive place. In addition to equipment, the author scrutinizes such construction features as floors, walls, ceilings, ventilation, offices, and locker rooms.

INSTITUTIONS

Vol. 46, January, 1960

*The food service industry takes a serious look at new buying patterns. J. Wilkinson.—p. 14.

*Food flavor and the scientific method.—p. 16.

*The transformation in food service. R. Flambert.—p. 57.

*Operation-tested recipes feature sour cream gourmet ingredient. A. M. Macfarlane.—p. 84.

*Modern pot and pan washing methods. R. V. Seaman and R. Iverson.—p. 105.

*Choosing the right dishwasher. N. Schneider, Jr.—p. 124.

*Best in beverages.—p. 140.

*Food service control—pounds can do it better than dollars. M. Kolinchak.—p. 148.

New Buying Patterns. Things are going to be quite different for the institution food buyers in the sixties. Individual purchasing is predicted to be on its way out and will be replaced by food buyers' cooperatives and voluntary groups set up by wholesalers and others. The author discusses some of the other trends and changes in food buying practices which are foreseen in the future.

Flavor Testing. Food flavors can be researched and the results may be quite meaningful to a food service operator. This article tells how an operator can set up his own taste-testing panel so that he may introduce new foods or new combinations of flavors to patrons on a trial basis in order to determine their appeal. The crux of the entire theory is that laymen can express taste preferences, and these taste preferences can be measured by a scientific method and applied by the operator.

Food Service Transformation. The author reports that the day of the chef as master has passed and the architect, designer, consultant, accountant, and supervisor have stepped in. Major trends which have developed in the food service industry and how these trends have necessitated radical changes in the design of kitchens and commercial equipment are pointed out. "One of the most important changes in food service operations is the trend toward use of business methods."

Gourmet Ingredients. Two "old fashioned" dairy products have migrated from the farm and are making a name for themselves through commercial mass production. The dairy industry has taken the guesswork out of making both sour cream and buttermilk. These two items can do wonders for the most simple or elaborate fare, and the author provides thirty-six recipes, in which sour cream and buttermilk are ingredients.

Pot and Pan Washing. "In our business of serving the public, we are very careful about the condition of our dishes, silverware, and glasses; however, we will sometimes use a corroded or half-clean pot or pan." The article cautions that the highly important pot-and-pan-washing operation must not be minimized and squeezed into the kitchen by makeshift arrangements. Minimum requirements for proper equipment, correct detergents, and proper training of employees are presented for maintaining high standards of cleanliness.

Choosing a Dishwasher. A detailed cost analysis will simplify your choice and provide better results when the purchase of a new dishwasher is being considered. This article is based on a study to determine an economic evaluation of two types of dishwashing machines. It deals with the analysis of the pertinent costs, both fixed and variable, of using equipment designed for the spread-load method, and equipment designed for the maximum-peak-hourly-load method of dishwashing.

Beverage Briefs. "A majority of

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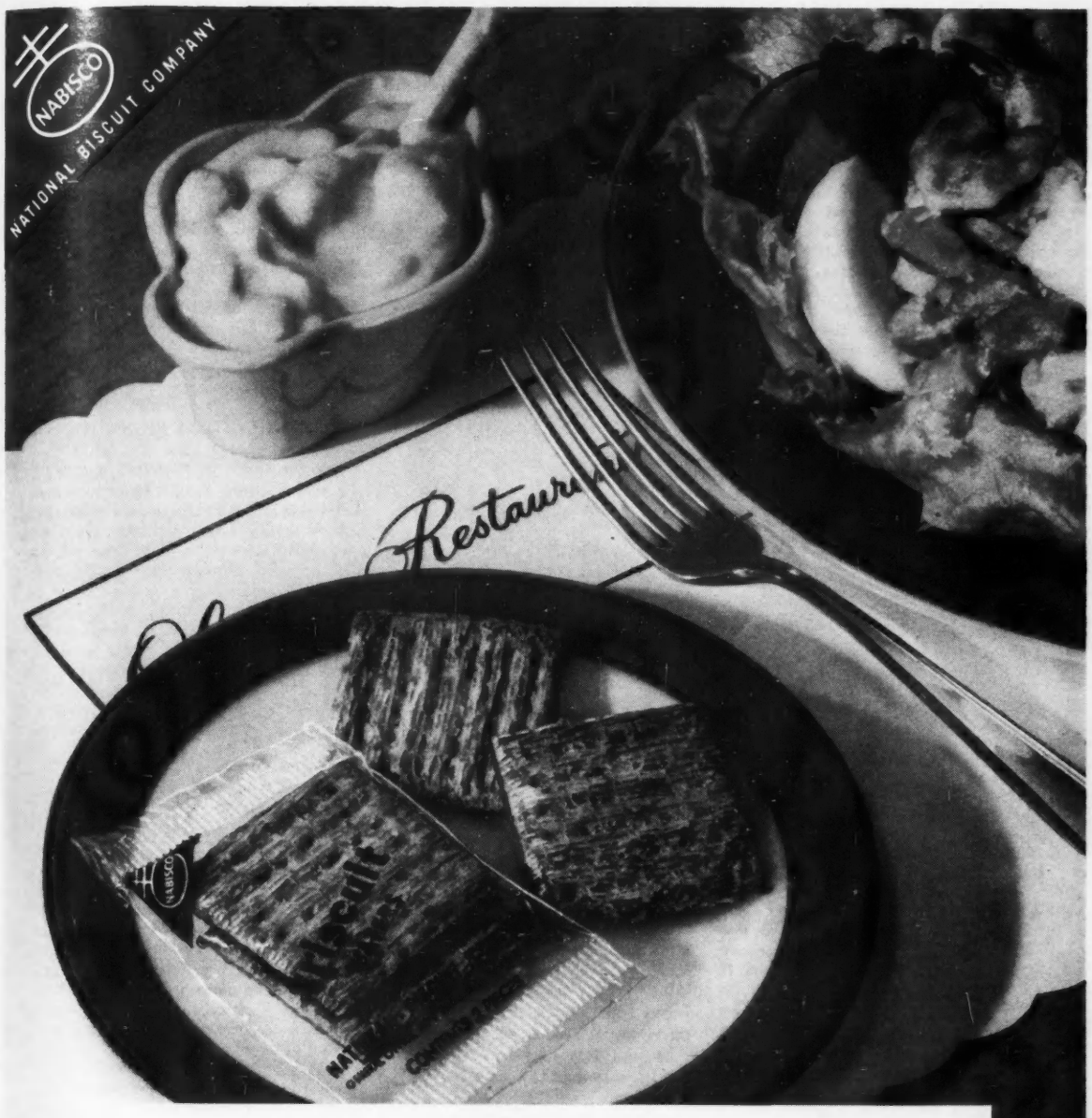

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patrons judge a food service establishment by the beverages it serves." From the Coffee Brewing Institute comes a detailed report on purchasing pointers and the use and care of equipment. Other beverages, such as milk, fruit juices, tea, and hot chocolate, are also covered in the article.

Pound vs. Dollar Control. In analyzing the problems involved in food service control through cost allowance, this author illustrates the inflexibility of this method in the face of unexpected price trends and unusual seasonal fluctuations. "A sure way to maintain a desired level in food service is to use poundage allowances for control purpose, and pounds also control dollars." Information is provided on three phases of the poundage control system and how the system can be inaugurated in any type of institution with little difficulty.

PERSONNEL JOURNAL

Vol. 38, December, 1959

*What makes *your* subordinates tick J. L. Green.—p. 253.

Vol. 38, January, 1960

*A supervisor looks at "human relations." H. T. Rosenberger.—p. 292.

Views on Subordinates. What are the motivating forces behind subordinates from the viewpoint of supervisors and management? The author relates the points that were brought out during a meeting of a company's executive committee who were responsible for a variety of supervisory functions within the company operations.

Dealing with People. Most supervisory functions are permeated with human relations, and the art of building and maintaining good relationships can never be overworked. Sincerity and effort are major requirements, as well as adapting your approach with the individual in mind, if effective working relationships are to be achieved. The author itemizes twelve kinds of situations which require especially careful handling, as well as eleven rules to follow for improving one's effectiveness in dealing with people.

PROFESSIONAL NURSING HOME

Vol. 1, October, 1959

*How's the food? G. E. Acker.—p. 32.

Nursing Home Food—Questions and Answers. The author asks some simple, but revealing questions about the food served in nursing homes. She points out that the answers may be the key to food budgeting, purchasing, and planning practices that could be improved for greater satisfaction and efficiency. She lists five steps to effective institutional food buying and shows why a good food buyer should have the answers to the questions of what, how much, where, and when to buy.

VOLUME FEEDING MANAGEMENT

Vol. 13, December, 1959

*Water heaters and boosters.—p. 26.

*Almonds—for low-cost elegance. I. L. Dolan. —p. 44.

Hot Water. A fundamental part of any food service operation is hot water and the equipment to produce it, and it is a predictably expensive adjunct. The largest consumption of hot water comes in dishwashing where water must also be supplied at two temperatures. Three methods of utilizing hot water heating equipment to provide these two different temperatures are discussed. The most economical methods for storing and using hot water are also indicated.

Almond Bumper Crop. With this year's bumper crop of almonds, luxury items can be created for the menu at a budget price. The author tells of the many easy-to-use varieties, menu uses, and recipes which use almonds. Illustrations show the forms in which almonds are available.

WHAT'S NEW IN HOME ECONOMICS

Vol. 24, January, 1960

*Vegetable cookery—up to date! F. L. Beinert.—p. 50.

Vegetables All. Fresh, frozen, canned, and dried vegetables are scrutinized by the author. The up-to-date general rules for cooking each form of vegetable are discussed and new innovations in preparation, packaging, and use are outlined.

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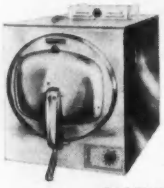

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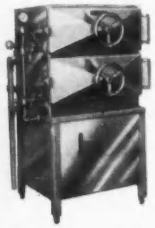

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BIOGRAPHICAL NOTES FROM THE HISTORY OF NUTRITION

Baron Kanehiro Takaki—March 15, 1849–April 12, 1920

Beriberi has long been a scourge of the rice-eating countries. The theory that beriberi was in some way related to diet was not new. However, it was Baron Takaki, who, from 1883 to 1885, demonstrated with a well planned, controlled experiment that improvement of the diet would eliminate beriberi. Even so, there was resistance to this idea; some still believed it to be miasmatic in origin, and others were sure it was caused by bacteria. The work of Eijkman (1897) and Grijns (1901) in the Dutch East Indies provided more conclusive evidence of its dietary origin. A full explanation was not obtained, however, until the vitamin theory of Casimir Funk (1912) and the identification by McCollum and Davis (1915) of a water-soluble factor, B_1, as well as a fat-soluble factor.

Kanehiro Takaki was born March 15, 1849 in Kagoshima Prefecture in Japan. His father was one of the guards of the Imperial Palace at Kyoto. Takaki went to England in June 1875 to study medicine in St. Thomas Hospital, London. He stayed there five years and then returned to Japan as Director of the Tokyo Naval Hospital; two years later (1882), he was made Vice Director of the Naval Medical Bureau and then Director (1883).

Takaki had long been acquainted with beriberi or *kakké*, as it was called in Japan; the occurrence of the disease was high in the Navy, with an average of 324 cases and 8.39 deaths per 1000 men in 1883. Takaki carefully and systematically studied the disease, its occurrence and location. He found that it was most frequent at the end of spring and summer, and that soldiers, sailors, policemen, students, and shop boys suffered most. It was more common in large towns but was also present in small ones; it occurred without relation to the kind of living quarters or clothes. Finally Takaki turned his attention to food as a cause, and dietary calculations showed that the naval rations were high in carbohydrate and did not contain enough protein to make up for the body loss of nitrogen. The higher the carbon: nitrogen ratio of the diet, the higher was the incidence of beriberi.

He proposed some dietary changes to the Navy (1882), but there was opposition. The following year when he became Director, he was able to carry out an experiment to demonstrate the effectiveness of diet. The careful planning and control of the experiment reminds one of Lind's early clinical work on scurvy.

Notes taken from a Japanese medical journal (April 1885) tell the story. *Riujio*, a training ship bearing 276 men including officers, sailed from Shinagawa to Wellington, New Zealand; then to Valparaiso, Chile; Callao, Peru; Honolulu; and home; 272 days on the trip; 160 cases of *kakké* occurred and 25 deaths before reaching Honolulu. The carbohydrate: nitrogen ratio of the diet was 1:28. *Tsukuba*, a training ship, was sent to follow the same course with an improved diet; the carbohydrate: nitrogen ratio was 1:15. There were no deaths, although four cadets and ten men who had not eaten meat as the others did, developed beriberi. The voyage lasted 287 days.

Takaki had increased the meat, fish, and vegetable content of the diet, reduced the rice content and added barley. Dietary improvement was an effective cure for beriberi, but this evidence was not accepted at the time, partly because of the wrong explanation and partly because of the belief in a bacterial origin.

Takaki was created a Baron in 1905. In 1906, he lectured on beriberi in London and the same year delivered the Cartwright lecture on Military Hygiene in New York. He died on April 12, 1920.

REFERENCES: Takaki, K.: The preservation of health amongst the personnel of the Japanese Navy and Army. Lancet 170: 1369, 1451, 1520, 1906; Health of the Imperial Japanese Navy. Lancet 2: 86, 189, 1887; Takaki, K.: Military hygiene of the Japanese Army. New York J. Med. 83: 1161, 1906.—*Contributed by E. Neige Todhunter, Ph.D., Dean, School of Home Economics, University of Alabama, Tuscaloosa.*

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Summer Study Opportunities. *Iowa State University*, Ames, will offer a special Food and Nutrition Institute, June 13 to 25, which will carry 2 or 3 college credits. It has been planned "to strengthen the understanding of the college teacher in basic principles of food preparation; to provide up-to-date information on topics of current interest in food and nutrition; and to exchange viewpoints on teaching techniques and current problems."

Iowa State has also planned a special group of courses, to be given from June 6 to July 27, to help graduates in liberal arts or graduates from small colleges complete academic requirements for membership in A.D.A. Courses from this group will also be helpful to school lunch managers and directors.

June 28 to July 28 have been set as the dates for a seminar on operational control procedures in institutional food service to be held at *Michigan State University*. The course, which will carry 2 term credits, has been designed to help school, university, and industrial food service managers, restaurant operators, and hospital dietitians to understand better the hows and whys of operational control. Special emphasis will be given to recipe standardization, portion control, and storeroom procedures.

A two-and-a-half-week workshop in administration and therapeutic dietetics will be given at the *University of Minnesota's* School of Home Economics, June 15 to July 1. The workshop will serve as a refresher course for hospital dietitians. Methods of training personnel, systems of cost control and purchase of food and equipment for hospital food services will be included in the administrative part of the course. Diabetes control, dietary modifications for pre- and post-operative conditions and for gastro-intestinal abnormalities, and the use of sodium- and fat-restricted diets will be included in the section on diet therapy.

Syracuse University and the Nutrition Bureau, New York State Department of Health this summer will offer for the fourteenth year a Community Nutrition Institute, June 20 to July 1. The Institute will present a public health approach to nutritional problems for nutritionists, physicians, nurses, dentists, dietitians, and health educators. During the first week, the program will be concerned with the evolution of the growth processes of cells and organ systems as they develop and differentiate, to produce the organism known as the human being. Anomalies will be discussed, together with the ways and means by which nutritional support may be best provided in such cases. During the second week, a review of recent research in agriculture and food technology is planned, with a look into the future.

In Canada, a three-day course in nutrition education will precede the biennial convention of the Canadian Home Economics Association, July 4 to 6, in Edmonton. Sponsored by the Nutrition Division, *Canadian Department of National Health and Welfare*, the course will be designed for professionally-trained home economists, dietitians, nutritionists, public health nurses, doctors, and dentists. Topics to be covered will include: normal nutrition, infant nutrition, geriatric nutrition, teaching nutrition, emergency feeding, world feeding, and nutrition education in professional training. Further information is available from the Nutrition Division, Department of National Health and Welfare, Ottawa, Ontario.

June 13 to 17 have been set as the dates for the second Public Health Nutrition Institute to be offered at the Graduate School of Public Health, *University of Pittsburgh*. A critical review and analysis of current nutrition research with applications to public health programs will be the basis of this Institute, which will be sponsored by the Division of Nutrition, Pennsylvania Department of Health.

Safe Seasonings and Flavorings. On January 20, the Food and Drug Administration released a list of 150 naturally derived seasonings and flavorings which have been found safe for use in food, according to qualified experts. Manufacturers who use these flavors need not furnish further proof of their safety, under the new food additives regulation. The list is divided into three parts: (a) spices and other natural seasonings and flavorings derived from leaves, roots, barks, and berries; (b) essential oils, oleoresins (intermediate flavoring products), and natural extractives, including distillates; and (c) several miscellaneous products not derived from plants. The list includes all of the most common household items, such as cinnamon, cloves, nutmeg, thyme, and vanilla, as well as more gourmet-type seasonings, such as coriander, mace, savory, and extracts of balsam of Peru, spike lavender, wild cherry bark, and ylang-ylang.

Plentiful Foods MONTHLY LIST

The Department of Agriculture lists the following foods as expected to be in plentiful supply during March:

Protein foods
Eggs
Milk and dairy products
Shrimp
Other foods
Almonds
Cabbage
Carrots
Celery
Cranberry products
Filberts
Lard
Oranges and orange products
Peaches, canned freestone
Peanuts and peanut products
Raisins
Rice

1960
WHITE HOUSE
CONFERENCE

From March 27 to April 7, some seven thousand persons will meet in Washington, at the invitation of President Eisenhower, for the Golden Anniversary Conference on Children and Youth. Participants will be the representatives of organizations concerned with the problems of the conference who have been chosen for their ability to discuss the theme of the conference: "Help Young America Grow in Freedom." Icie Macy Hoobler, Ph.D., Sc.D., will represent The American Dietetic Association at this meeting. In the January issue of the JOURNAL, Dr. Hoobler reviewed the background of the five previous White House Conferences on Children and Youth so that members may follow news items about the meeting with greater understanding and appreciation. A report of the meeting itself will be made at a later date.

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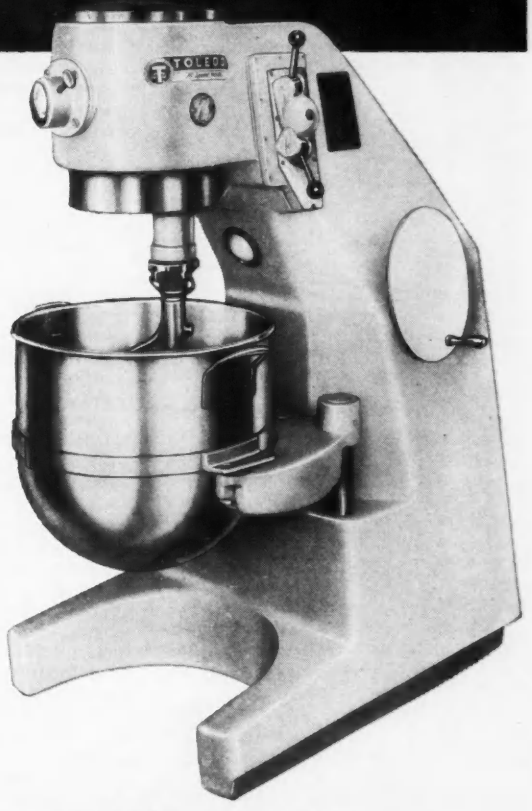

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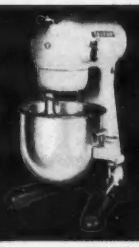

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Frozen Foods for March. For March menus, the National Association of Frozen Food Packers feels the following frozen foods will be especially useful and appropriate:

Fruits and Juices

APRICOTS—not generally available to the consumer in retail stores; thus, in restaurant or institutional meals, they may be used as "features."

PEACHES—the in-season flavor of this fruit provides special goodness to a menu when used in salads or desserts.

FROZEN DESSERTS—fruit pastries save labor cost and add menu variety in the quantity food service operation.

Vegetables

CUT CORN—serve in combination with frozen cut green beans or mixed with frozen Lima beans. A new and attractive combination is frozen cut corn with frozen asparagus cuts and tips.

POTATO PRODUCTS—these come in many different forms to give menu variety without adding labor cost.

DuBois Scholarships. The T. V. DuBois Foundation has announced that during the past two years, awards to forty-four of the fifty-two state dietetic associations have been made under its scholarship program. The program, which had its inception ten years ago, has been designed to assist qualified dietetic interns who might otherwise have been obliged to forego their internships. In addition, through its presentations, the Foundation has aimed at helping the recruiting program for dietitians. In all cases, the T. V. DuBois Foundation Dietetic Intern Scholarship was an award to the state dietetic association involved, and the accepting association assumed complete responsibility for selection of the recipient. The only stipulation made by the Foundation was that the institutions selected for the internship be those with curricula approved by A.D.A. In the ten years of the program, the Foundation has aided more than a hundred of the nation's dietitians.

Conference on Human Nutrition. On March 4 and 5, the Fifth Ohio Conference on Human Nutrition will be held, under the sponsorship of the Ohio Nutrition Committee, on the Ohio State University campus, Columbus. Features of the program will be:

"Emotions, Appetite and Food Acceptance of Young Children"—Dr. Giulio Barbero, Children's Hospital, Philadelphia

"Iron Requirements in Infancy"—Dr. Irving Schulman, Children's Memorial Hospital, Chicago

"Nutrition in Development and Early Care of Teeth"—L. S. Pettit, D.D.S., Ohio State University

"Panorama of World Nutrition"—William Darby, M.D., Director, Division of Nutrition, Vanderbilt University School of Medicine, Nashville

"Effective Nutrition Teaching for Young Adults"—discussed by Robert E. Shank, M.D., Washington University School of Medicine, St. Louis, and Martha Nelson Lewis, Ohio State University

"Nutrition for the High School Athlete"—four discussants

"International Nutrition as the American Visitor Sees It"—three discussants

"The National Food Standard and Its Meaning for Health"—Robert E. Shank, M.D., Washington University School of Medicine, St. Louis.

Meetings. The following meetings may be of special interest to dietitians:

National Restaurant Association, May 9 to 12, Chicago

Catholic Hospital Association, May 30 to June 2, Milwaukee

American Home Economics Association, June 28 to July 1, Denver

Canadian Home Economics Association, July 5 to 8, Edmonton

New WHO Report. *European Technical Conference on Food-Borne Infections and Intoxications* is the title of a new report, No. 184 in the World Health Organization's Technical Report Series. In it, the work of the conference held February 16 to 21, 1959 in Geneva is reported. The various control measures designed to promote the production of pure and safe food are reviewed. It is important that such measures be strengthened, not merely in each individual country but also at the international level, since foods are being exported and imported on an ever-mounting scale and tourist travel is continually increasing. For such measures to be effective, they must be based in the first place on proper notification of cases of food-borne disease in each country and on the collation at the international level of the reports published by the public health administrations. In addition, thorough epidemiologic surveys are required. The conference also drew up a series of recommendations on what the physician should do when faced with a case of food-borne disease, on what action should be taken by the public health services and laboratories, and on national and international measures for the control and prevention of such diseases. Copies of this report may be ordered from the International Documents Service, Columbia University Press, 2960 Broadway, New York 27, for 30 cents each.

Report on Purchasing Practices. The New York State Extension Service has sponsored a study to learn the kind of information it can provide to hospitals to help them improve their food purchasing and management practices. The study was divided into two parts: the first, related to the factors which influence the food buyers' purchasing practices and the sources of marketing information on which they rely; the second, a survey

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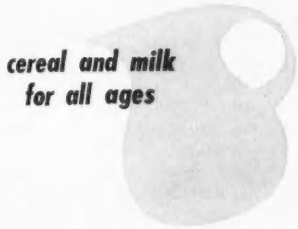

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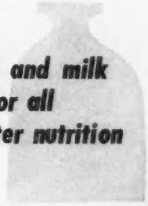

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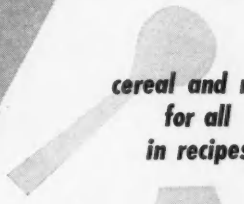

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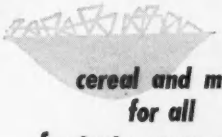

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of present purchasing practices for specific foods and of the influence which the training of the food buyer, the size of the hospital, and the location of the hospital had on these practices. The results of this study have now been reported by Nancy Colburn in *Food Purchasing Practices in Selected Small New York State Hospitals.* This is A. E. Ext. 44, dated June 1959 of the Department of Agricultural Economics, New York State College of Agriculture, Cornell University, Ithaca. Copies may be requested from that Department.

Low-Sodium Recipes. Dietitians at the VA Hospital, Houston, have developed a mimeographed cook book, *Low Sodium Cookery,* for use by their patients who must follow sodium-restricted diets. In addition to an extensive collection of recipes categorized under the usual headings, the introduction makes suggestions on how to adapt regular food preparation to the needs of the person on a sodium-modified diet and how to order when eating in a restaurant. A special section on "Things to Remember" is also included, as well as: lists of allowed foods and foods to avoid, according to food groups; several suggested menus; definitions of terms; and a list of approximate substitutions. A copy of this publication has been placed in the A.D.A. Library, and is available for loan to members.

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Statement on Arteriosclerosis. In the belief that many people do not know the danger signals of arteriosclerosis and what preventive measures may be taken, the National Health Education Committee, Inc., has prepared (in booklet form) "A Statement on Arteriosclerosis." In it, the factors which predispose individuals to arteriosclerosis, heart attack, and stroke are listed as overweight, elevated blood cholesterol level, elevated blood pressure, excessive cigarette smoking, and heredity. The booklet cites thirty references from the scientific press to support the Statement. Authors of the Statement are: Paul Dudley White, M.D.; Howard B. Sprague, M.D.; Jeremiah Stamler, M.D.; Fredrick J. Stare, M.D.; Irving S. Wright, M.D.; Louis N. Katz, M.D.; Samuel L. Levine, M.D.; and Irving H. Page, M.D. The Statement is also supported by 106 members of the American Society for the Study of Arteriosclerosis, whose names are listed in the booklet. Copies of the Statement for distribution may be requested from: National Health Education Committee, Inc., 135 East 42nd Street, New York 17.

Freezing Rolls. There is an advantage in freezing rolls, even for as short a period as 24 hr., according to data from a study conducted at the American Institute of Baking, under contract with the USDA's Agricultural Research Service. Cinnamon and dinner rolls were wrapped in Cellophane soon after baking to prevent moisture loss and then frozen and stored at 0°F. for 24 hr. After defrosting, they had lost only about half as much freshness as rolls stored at room temperature, according to reports from a taste panel. Some of the rolls were kept in frozen storage for two months without serious loss of freshness.

When defrosting, it's best to keep rolls covered to prevent the loss of too much moisture. Particularly with cinnamon rolls, defrosting in a place that is somewhat warmer than room temperature also helps to maintain freshness. A commercial defroster which operates at about 115°F. was used in this study.

News of State Associations

Illinois Dietetic Association. The second class for food service supervisors sponsored jointly by the Chicago Board of Education and the Illinois Dietetic Association, began in February. The program includes 60 hr. of classroom work, to be given over two semesters in night school. Under the direction of Bonnie Miller, course instructor and coordinator, the curriculum includes work in nutrition, food administration, sanitation, and supervisory and job training techniques. Following the classroom instruction, students will have six

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months of supervised practice in a hospital or other food service unit approved by a committee of the Illinois Dietetic Association. Students who successfully complete the course will receive certificates from Wright Junior College, 6 college credits, and will be eligible for the alumnae association.

Massachusetts Dietetic Association. Fall activities of the Massachusetts dietitians have included meetings on public health and therapeutic aspects of dietetics, as well as cooperation with the Greater Boston Diabetes Society in presenting the annual Diabetic Health Fair. For this event, dietitians were available to answer questions, give out information, and help people with the food problems connected with diabetes.

Missouri Dietetic Association. In St. Louis this fall, several dietitians served as guest editors for the "Better Meals for Better Families" promotion carried out by the St. Louis *Post-Dispatch*. Others presented, in November, demonstrations for the Catholic Hospital Association's Workshop for Purchasing Agents held in St. Louis.

New Jersey Dietetic Association. The *Middle Jersey Dietetic Association* enjoyed several stimulating meetings last fall. At the season's opening meeting, Dr. I. E. Bleeker, Chief of Cardiology, VA Hospital, Lyons, discussed "The Role of Sodium in Cardiovascular Diseases." In October, guest speakers were Paul Bayer and Harry Lansing, co-directors of RADIF, who spoke on "Radioactive Fallout." They directed their remarks specially to the areas of foods, food handling, and food containers. "Aspects of Lipid Metabolism" was the title of the talk by Dr. Arthur Roth, Internist, at the November meeting.

The *Northern Jersey Association* in November heard Dr. Rowland Goodman, Department of Cardiology, East Orange General Hospital, discuss cholesterol and its relation to diet.

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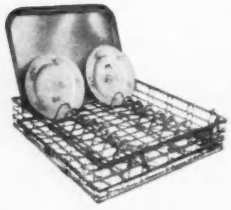

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Association Activities

A.D.A. Representatives. Association representatives attending and participating in state dietetic association spring meetings in March and April will be:

March 3–4—Doris Johnson, Ph.D., *Illinois*, Chicago
March 11–12—Lorraine G. Weng, *Oklahoma*, Oklahoma City
March 25–26—Edith A. Jones, *Alabama*, Tuscaloosa
March 31–April 1—Virginia F. Harger, *Missouri*, Cape Girardeau
April 6–9—Doris Johnson, Ph.D., *Texas*, Fort Worth
April 8–9—Gertrude E. Miller, *Washington*, Pullman
April 20–21—F. Eugenia Whitehead, Sc.D., *Indiana*, Indianapolis
April 21–23—Beula B. Marble, *New York*, Syracuse
April 21–23—Doris Johnson, Ph.D., *Virginia*, Staunton
April 22–23—Grace S. Shugart, *Wisconsin*, Madison

Mid-Year Meetings. The A.D.A. Executive Board held its mid-year meetings from January 18 through January 25, with the Council of the House of Delegates meeting January 22, and the Coordinating Cabinet convening on January 23. The Finance Committee met January 21.

Many interesting and pertinent items were discussed, a summary of which will be included in the March issue of the *Courier*, which will be sent each A.D.A. member, at the request of the Executive Board.

1960 National Health Forum. The National Health Council will hold its 1960 National Forum, March 14 to 17, in Miami Beach. "Positive Health of Older People" will be the theme of the conference. Sixty-seven organizations, including The American Dietetic Association, are members of the NHC. Nelda Ross Larsson, one of our Council representatives to NHC, will be our official representative. Mrs. Larsson has participated as a committee member in the program planning.

in the season of

acute infections, extra

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provides the increased

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and fluid needed during

FEVER

to prevent deficiency and

help maintain resistance*

*Tisdall and Jolliffe note the systemic relation in animals between vitamin C and resistance to infection, with increased needs evident in upper respiratory streptococcal infections.

– In: Clinical Nutrition ed. by Norman Jolliffe et al. New York, Paul B. Hoeber, Inc., 1950, pp. 590-91, 637-38.

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Several members of our Association are giving papers on the program.

Homemaker Services. Frances Godshall, Ph.D., Temple University, Philadelphia, represented the Association at a National Conference on Homemaker Services in Harriman, New York, February 14 to 16. The National Health Council has been very active in activities concerned with this conference.

Local Health Departments. Elizabeth Agnew Lund, New York State Department of Health, White Plains, served as our official representative, at the 1960 annual meeting of the National Advisory Committee on Local Health Departments, held in New York City on January 14. This Committee is supported and staffed by the National Health Council. The theme for the day's program was "Community Health Services." The meeting considered such matters as the clarification of the requirements, functions, and resources for community health services, their evaluation and promotion. Herman E. Hilleboe, M. D., Commissioner, New York State Department of Health, discussed "Emerging Concepts on Community Health Services." This was followed by a panel discussion by representatives from both official and voluntary agencies on ways of "Meeting Community Health Needs."

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And many doctors recommend Cream of Rice in modified diets for food allergies, ulcers, high blood pressure, hypertension, intestinal distress and digestive troubles.

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3

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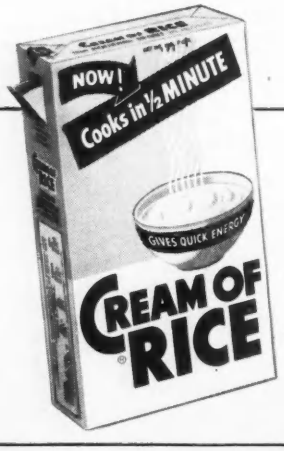

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1958-1959 Annual Reports & Proceedings. By the time this issue of the JOURNAL is in the mail, each A.D.A. member will have received her copy of the 1958-1959 A.D.A. *Annual Reports & Proceedings.* If, for some reason, your copy has not reached you, please let the A.D.A. Headquarters office know so that we may check your mailing address.

Highlights in the *Proceedings* include the discussion and reports at the 1959 House of Delegates meeting in Los Angeles; the reports of the four Sections, of our national officers at the 1959 business meeting—such as the announcement of the W. K. Kellogg grant concerning the food service supervisor, the A.D.A. gift policy, and so on—and reports of our A.D.A. boards and committees, as well as many other matters of special interest.

Conferences on Aging. There is continued interest in the regional conferences on aging being sponsored by the Council on Medical Service of the American Medical Association. State dietetic associations in the various regions have been invited to send representation.

Jane Sedgwick Pirkey, President of the California Dietetic Association, reported that several members of that association attended the Regional Aging Conference held in San Francisco, January 20 and 21. Margaret C. Warde served as the recorder for the group. The following are some of the thoughts from the conference:

(a) We need to change the nineteenth century concepts on aging which we are harboring.

(b) The handicaps of a "fixed" retirement age of sixty-five need consideration.

(c) The basic needs of older people are the same as those of other people.

(d) We need more retirement plans which consider both the physiologic and chronologic age, as well as the value of the employee to the company.

(e) We should prepare ourselves for old age. Young people must be made aware that youth is the time to prepare for an orderly retirement. Begin early in life to learn avocations.

(f) A four-point program of preparation includes physical, financial, social, and psychologic plans.

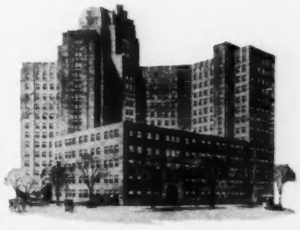
(g) Do not "retire from"; rather, "retire to." Determine what things are worth pursuing. Be interested in the welfare of other people throughout your working years, and you will be interested in helping others on retirement.

(h) For successful retirement, start early in life to know where you are going. Set a goal.

The feature of the program on "Look Ahead in Health Care," included descriptions of chronic illness service centers, homemaker services, progressive patient care, and rehabilitation services in nursing homes. It furnished insight for the conference group into the sympathetic care which

Swedish Covenant Hospital
Chicago, Illinois

Louis A. Weiss Memorial Hospital
Chicago, Illinois



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will help oldsters to help themselves regain status if this is needed.

Obituaries

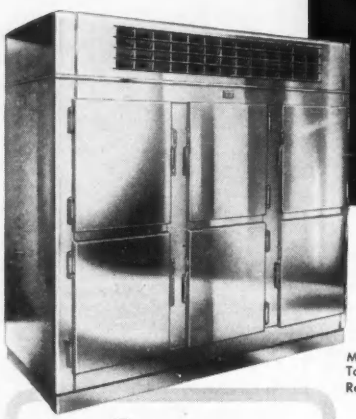
Mary Elizabeth Reid Fadeff. The Association has been notified of the death of Mary Elizabeth Reid Fadeff on December 14 in Dallas. Mrs. Fadeff, who had been a member of the Association since 1948, had been on the dietary staff of Scott and White Memorial Hospital, Temple, Texas, prior to her marriage. After moving to Dallas, she served as clinic dietitian for a private physician. She had been active in the Dallas Diabetes Association, having served as lay president of that group.

Eloise J. Pitts. One of the newer members of the Association, Eloise J. Pitts, lost her life in the National Air Lines plane which went down in the Gulf of Mexico in November. Miss Pitts was a graduate of the University of Louisville and had interned at the VA Hospital, Hines, Illinois. She was admitted to membership in the Association in 1957.

Margaret Sawyer. The Association lost one of its charter members, Margaret Sawyer, on December 17, 1959. At the first annual meeting of the Association in Atlantic City in 1918, Miss Sawyer—who was then helping the war effort with the Dietitian Service of the American Red Cross, Washington—was elected to serve as the Association's second Treasurer. In her professional work, she was, for a number of years, Director of the Consumer Service Department of General Foods. She had also been associated with the Glass Container Association of America, and during World War II with Todd Shipyard Corporation. She had made her home in Washington, D. C. in recent years.

Laura F. Schoenborn. The A.D.A. office has been notified of the death on December 24 of Laura F. Schoenborn in Arlington, Virginia. Miss Schoenborn, who had been a member since 1942, had been associated with the Maryland Department of Health, Easton, and more recently with the U. S. Public Health Service Dispensary, Washington, D. C.

Sister Anna Rita (McHugh). Word has been received of the death on October 10, 1959, of Sister Anna Rita (McHugh), former Superior of the Hospital of St. Raphael, New Haven, Connecticut. She had also been administrator of hospitals in Montclair and Paterson, New Jersey. She was admitted to A.D.A. membership in 1929. She was one of the first students of Fanny Farmer's Cooking School in Boston, and also one of the early instructors at the College of Home Economics, College of St. Elizabeth, Convent Station, New Jersey.



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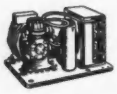

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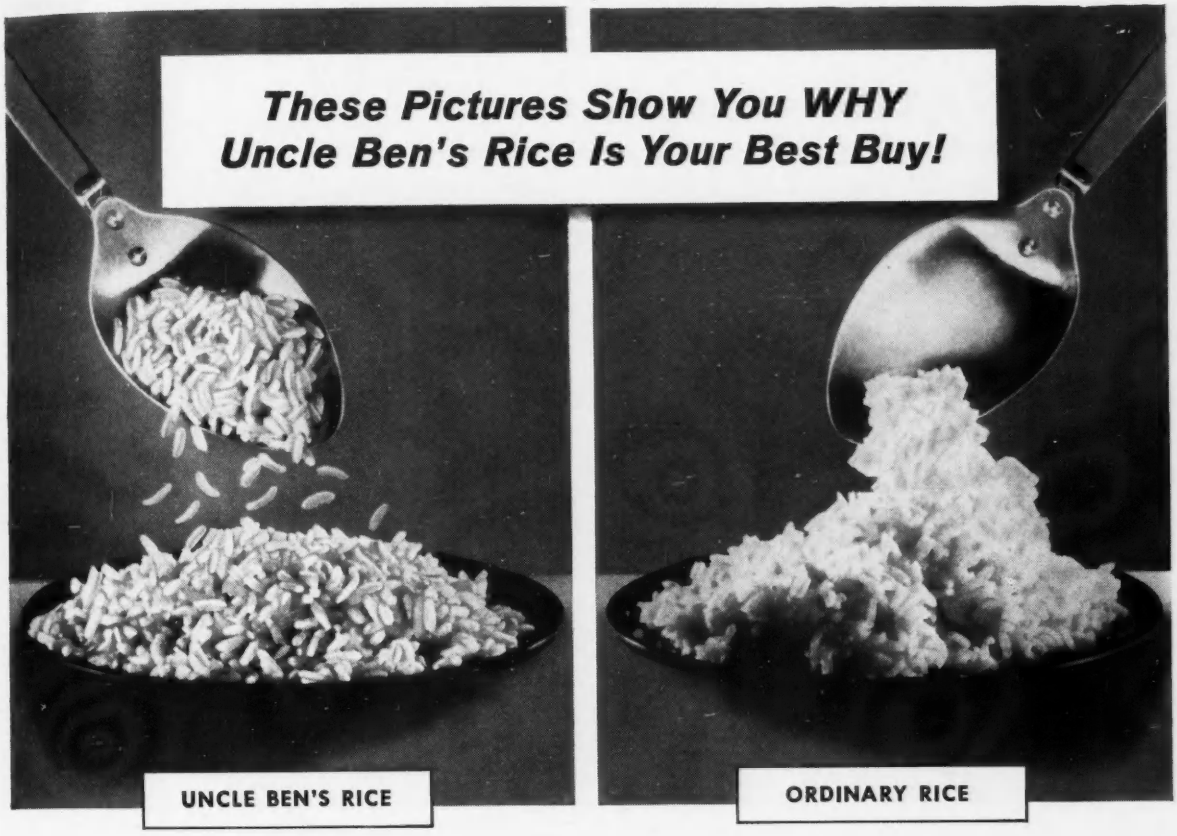
News of Products and Services

Abbott Laboratories has a twelve-page booklet, "So You're Going on a Diet," designed to be given to patients facing problems of weight control. Psychologic and dietary suggestions are included, along with a weight chart for men and women and sample meals for a 1500-calorie diet. A warning against proprietary pills, plans, and preparations and an admonition to consult a physician before attempting a reducing program are sounded.

An eight-page booklet, "15 Casserole Treasures" is the first in a new series of canned foods recipe booklets to be published by *National Canners Association.* Fish, chicken, macaroni, vegetables, and luncheon meat combinations are illustrated, and size of container with yield are given. Other booklets on salads, desserts, vegetables, and party foods are planned.

A new series of leaflets for use by professional workers in the area of maternal and child health and for parents who want help in a brief and simply written form has been released



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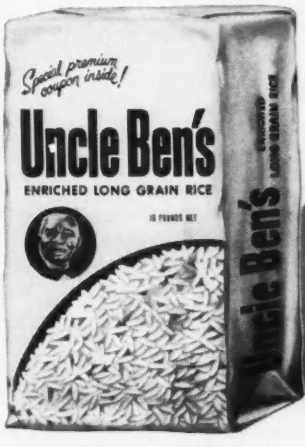
It's the portion cost that counts! For example, a 100-lb. bag of Uncle Ben's yields up to 1,920 half-cup servings—approximately 360 more servings than cheaper rices. It's these extra servings that lower your portion cost. As a result, Uncle Ben's costs no more per serving than ordinary rices . . . ACTUALLY LESS THAN 1¢ PER SERVING!



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This is a project of the Diet Therapy Section of The American Dietetic Association.

Single copy 50¢

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by *National Dairy Council.* "What to Eat Before You Are Pregnant, While You Are Pregnant and After the Baby Comes" gives easy-to-follow, basic nutrition information to the mother. "When Your Baby Is Bottle-Fed" contains concise and helpful facts on bottle feeding. "Feeding Your Baby During his First Year" is a guide for mothers as to what to feed their babies; how to go about feeding them; and hints on weaning. "Feeding Your Baby at Your Breast" is directed to the mother who is considering nursing her baby. A variety of supplementary material is also available for use in this area.

Where storage of expensive food, linens, or other items is desired, *Metropolitan Wire Goods Corp.* now offers a back section and a set of doors, which may be locked for security to its Erecta shelf cabinets. Backs are made in two parts, each 24 in. wide for easy shipment. The cabinets are available only in 48 in. lengths. Height may be either 62 or 72 in. Shelves are standard except the special shelf having a loop through which a lock is placed.

A new, mobile hot-food unit from *W. H. Frick, Inc.,* is designed to handle loads up to 700 lb., and to keep food hot and ready for service by plugging into an electric outlet. The unit has a capacity of fifty-four 10-in. plates. Over-all length is 36 in., width 25½ in., and height 42 in. Constructed of stainless steel, the unit features a removable electric heating element, hinged drop doors, drop push-pull handles, and strip bumpers.

A new 15-cu. ft. refrigerator (R-15) has been added to the line of *Nor-Lake Inc.* It features eight adjustable, plated wire shelves and two locking doors. Heater strips around door openings seal in the cold. Condensate removal is automatic.

A new product from *General Mills,* "Gravy Magic," has been prepared to assure smooth gravy and white sauce. Made of Gold Medal Flour, with portions of wheat berry, leavening, shortening with a freshness preserver, nonfat dry milk, and emulsifier, "Gravy Magic" is sprinkled into a chosen hot liquid and boiled. It will soon be available nationally.

"Sauce-Quik," the all-purpose sauce base, is offered by *Ac'cent-International* in a new 4-lb. metal can. The new container has a lid which may be replaced after using small quantities of the product. A wide mouth permits easy scooping. Either a basic white or brown sauce may be made by adding water, stock, vegetable juices, potato water, or milk, plus cooking a short time. Lemon juice, cheese, sherry, tomato paste, mayonnaise, and mustard are some of the ingredients which may be added for variation.

A toss-away paper pitcher for bedside water, or fruit and vegetable juices has been made available to hospitals by Dixie Cup Division of *American Can Company.* A 32-oz. handled

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1. Dietetic Internship Program: This 12-month internship (approved by the American Dietetic Association) is open to qualified college graduates. If accepted, you train as a hospital dietitian while receiving the prestige, pay and allowances of an Army officer.

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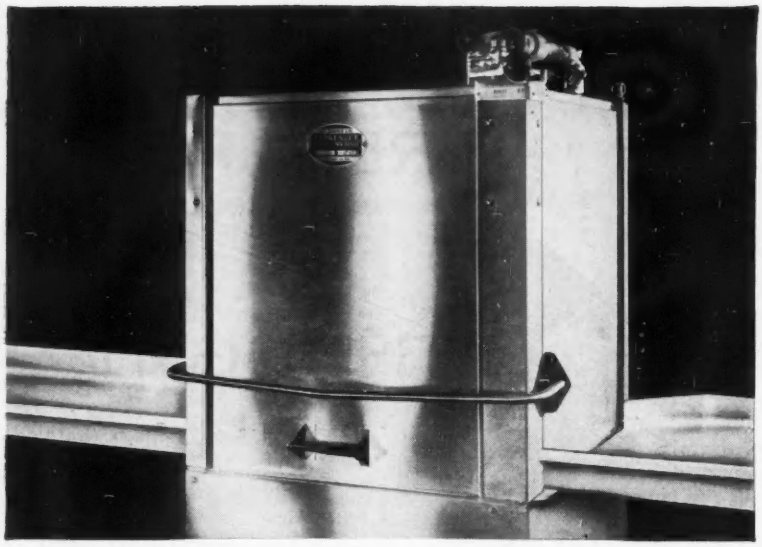

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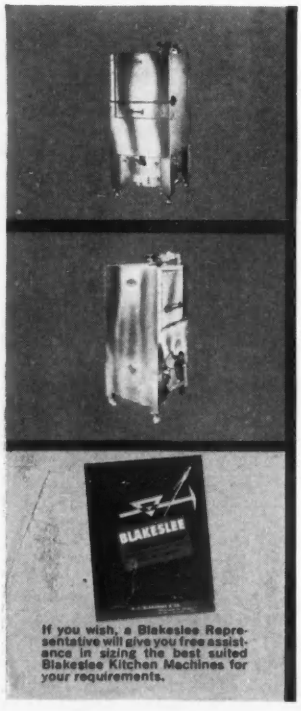
Standard equipment now on all "D" models. Available at slight extra cost on smaller "B" models.



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Pfaelzer Brothers has published an illustrated buyer's guide and price list for food service operators. Photographs in color of every item in Pfaelzer's line are included. Additional features are a menu pricing guide and a meat portion cost calculator which provides a quick, accurate way to determine costs per serving of meat. In tabulated form, the cost of meat ranging from 50 cents to $3.50 a lb. and portions from 1 oz. to 24 oz. are shown. By starting with the applicable cost per pound and reading down the chart to the desired portion size, the buyer obtains the portion cost. After determining portion cost, the menu cost is obtained by adding the cost of other courses to the meat cost. By locating the "menu price factor" corresponding to food cost percentage desired, also on the menu pricing guide, and multiplying total meal cost by price factor, the menu price is determined.

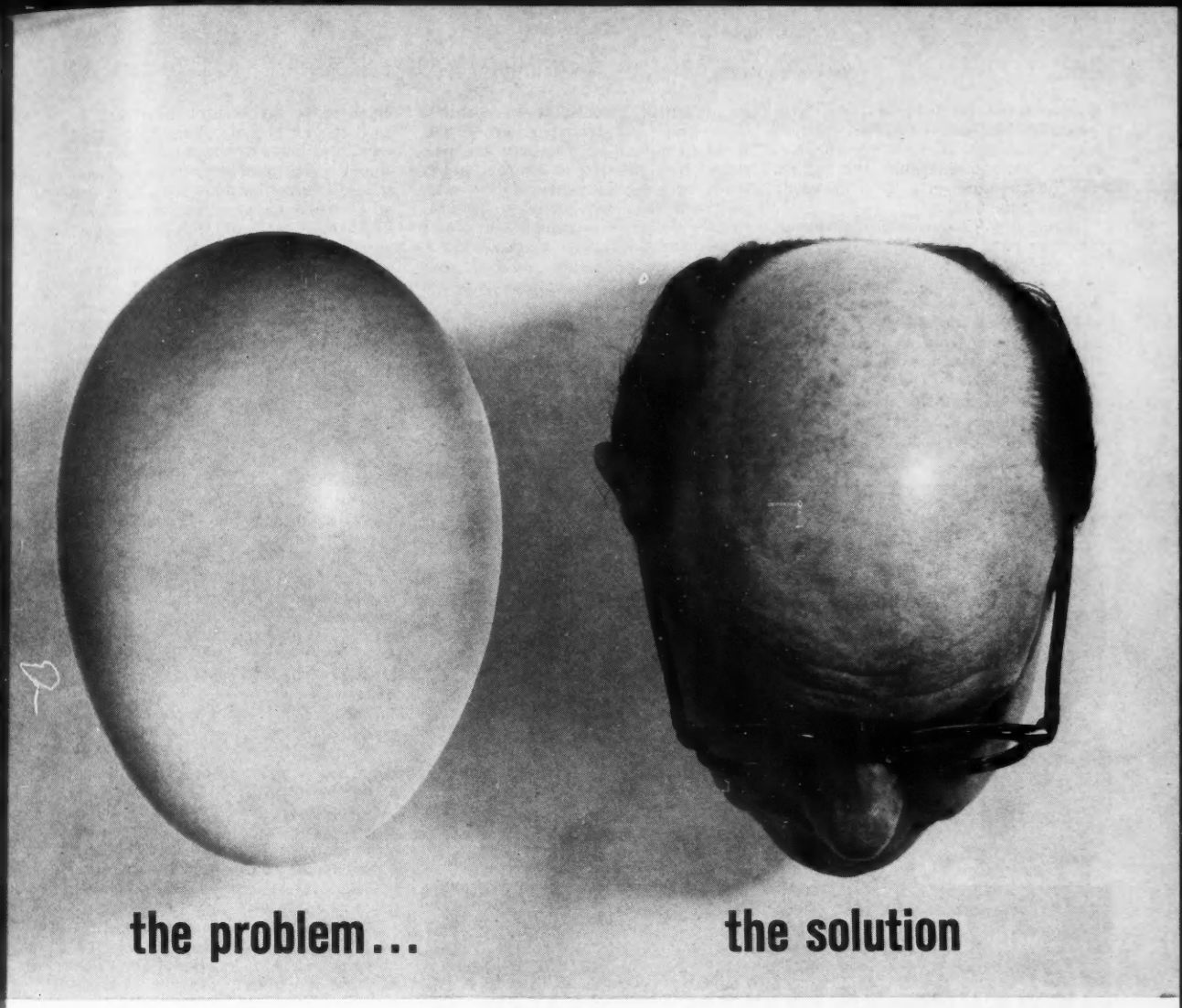
A new overshelf for dispensing silverware can be added to either of two mobile AMF "Lowerator" tray dispensers on a new AMF *Lowerator Division American Machine & Foundry Company* unit. Because both trays and silver are loaded in the washing area, then wheeled to the service area when required, the new unit minimizes handling and assures sanitation in self-service operations.

A translucent, rich yellow-brown, pebbled glass jar with screw cap, in 5-oz. size only, is replacing the traditional clear-glass 5-oz. jar of *Borden's* Instant Coffee. The amber color helps preserve the fresh flavor of the instant coffee from harmful light rays. The new label is coffee-brown and red on white to harmonize with the jar.

"Decor/Lowerator" is a new mobile unit being marketed by *Lowerator Division, American Machine & Foundry Company.* The special feature of the unit is the use of side panels of Formica or other plastic laminate which is available in a wide selection of decorator colors, patterns, or wood-paneling effects. Thus the unit can be manufactured to fit into the prevailing decor of a dining room or cafeteria. Decor/Lowerator is now available on all mobile AMF Lowerator, self-leveling dispensers. The panels are replaceable when redecorating is desired.

Four booklets, each confined to one category, comprise a new series of publications released by *Processed Apples Institute, Inc.* "The Happy Apple Heralds," illustrate a variety of ways processed apples may be used in main dishes, desserts, salads, or sandwiches. Titles of the booklets are: "Main Dishes That Are Different," "The Great Taste in Desserts," "Cakes, Cookies and Confections," "Salads . . . Appetizers . . . Relishes."

Another publication from *Processed*



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Apples Institute, Inc., "Fifteen New Quantity Recipes," features recipes from widely known restaurants. Printed on one side only, the recipes may be mounted on 5 by 8 in. cards for convenient filing.

Three new Swanson "TV" brand dinners have been introduced by *Campbell Soup Company*: creamed chicken with whipped potatoes and peas; Swiss steak in brown gravy with whipped potatoes and green beans; and macaroni and cheese with diced glazed carrots and peas.

Precision Metal Products, Inc., has announced the addition of seven new mobile dish carts to its line of food service equipment. Available in heated or unheated models, these stainless steel units will transport up to 350, 9-in. dishes. Other features are neoprene tired wheels to support heavy loads with top maneuverability, compactness for easy storage, No-Mar plastic lining to eliminate black dish edges, and adjustable stacking partition to accommodate various dish sizes. An eight-page catalog is available on request.

The new instant form of "Dutch Delight" has been introduced by *Martin H. Cope Co.* Dried white, sweet corn (without salt, sugar, or preservatives) now may be added directly to boiling water. Required cooking time is only 5 min. With the taste and savor of fresh corn, the instant corn may be used in any recipe calling for canned corn. Recipes are available, including cream corn, pudding, fritters, pancakes, or combinations with ham and other foods. The product is packaged in 10-, 25-, and 100-lb. cartons lined with polyethylene.

Previously available only to major airlines, *Van Brode Milling Co., Inc.*, now has made available to food service everywhere a set of individual plastic single-service, disposable salt and pepper shakers, filled and ready to use. Each shaker is imprinted "Personal—Just For You." The shaker tops are protected by easy-pull-off "S" or "P" tabs. They are available as a set or separately; the cost is 1 cent each.

Cereal Institute, Inc., will co-sponsor with the American Dairy Association the seventh annual "Spring Cereal and Milk Festival" during the month of April. The tenth "National Better Breakfast Month," another promotion by *Cereal Institute, Inc.*, will again be celebrated during September.

A new heavy-duty cart, "Binster," Model No. 37, has been introduced by *Bloomfield Industries, Inc.* With a bin capacity of 450 lb., it is designed for transporting such bulky products as ice, sugar, flour, soiled linens, and other heavy loads. Interior dimensions are: 19⅞ by 16 by 20 3/16 in. A wide top facilitates easy loading and unloading. The cart is made of stainless steel, finished to resist spotting and finger marks and equipped with roller bearings for smooth wheeling over all types of surfaces.

Also available from *Bloomfield* are perforated pans for steam table use in standard, full, and half sizes. The full-size pan measures 20¾ by 12¾ in.; the half-size pan, 12⅝ by 10⅜ in. Both sizes are made in 2½-, 4-, and 6-in. depths. Smooth perforations, rounded corners, and tapered sides permit easy nesting.

Bloomfield has also announced two-thirds and one-ninth sizes of stainless steel pans in 2-, 4-, and 6-in. depth with either dome-type or flat type covers to fit standard steam table well openings. *Bloomfield* pans are packaged in the factory in plastic bags to keep them free of dirt, dust, fingerprints, and grime. A new line of sectional pans made in extra-heavy gauge stainless steel will soon be available.

A handy pick-up fork to speed sanitary food service has also been announced by *Bloomfield*. Tines of the fork are made of stainless steel and precision-formed to fine points to penetrate hard surfaces or soft, yielding foods. It is especially intended for such items as butter, pickles, olives, cherries, fruit slices, meat, and bread. It operates with a simple plunger action, requiring only one hand.

Refrigerators in the new convertible MU series of *Koch Refrigerators, Inc.*, are installed as medium temperature (38°) cabinets which can be converted to zero temperature units by lifting out the "plug" and exchanging

End Mixing!
Save Time!
LSM
milk
with NEW
LOW SODIUM MILK
A Natural, Whole
LIQUID MILK
for low-salt diets
Needs no refrigeration—Can be shipped anywhere!
Pour LOW SODIUM MILK right from the can to patient's glass. Save time because there's no mixing. And each glass is assured the same natural consistency. LOW SODIUM MILK can be used whenever a sodium restricted diet is indicated.
Low Sodium Milk fortifies the nutritional value of any diet for it contains many of the proteins, vitamins and minerals so essential for good health and growth.
Each quart contains approximately 5% carbohydrates, 3.5% protein, 3.5% butterfat, 675 calories, AND LESS THAN 50MG. SODIUM.
Low Sodium Milk also available with low fat content
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800 Fulton Street • Pittsburgh 33, Pa.
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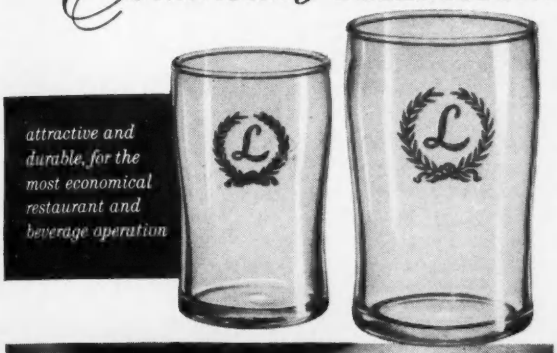
Libbey *Columbian* Tumblers...

attractive and durable, for the most economical restaurant and beverage operation



The complete line of Libbey Columbian Tumblers provides the right glass for every beverage. And because they're Heat-Treated, these tumblers stand up under hard usage . . . deliver an amazing number of servings to assure operating economy. Economy is assured by the famous Libbey guarantee: "A new glass if the rim of a Libbey 'Safedge' glass ever chips."

The attractive shape of Columbian Tumblers lends beauty to table settings, and every glass can be decorated with your crest or design for added prestige and distinction.

MAKE YOUR OWN SURVEY

Check the durability and economy of Columbian Tumblers from the Heat-Treated mark on the bottom of every tumbler. Left number shows the year of manufacture, and right designates the quarter.

An audit of Libbey Heat-Treated DATED Glassware in restaurants of 7 major cities showed an average of 1,650 servings per tumbler at a cost of 5.2 cents per thousand servings.

See your Libbey Supply Dealer for details or write to Libbey Glass, Division of Owens-Illinois, Toledo 1, Ohio.

LIBBEY HEAT-TREATED GLASSWARE AN (O) PRODUCT

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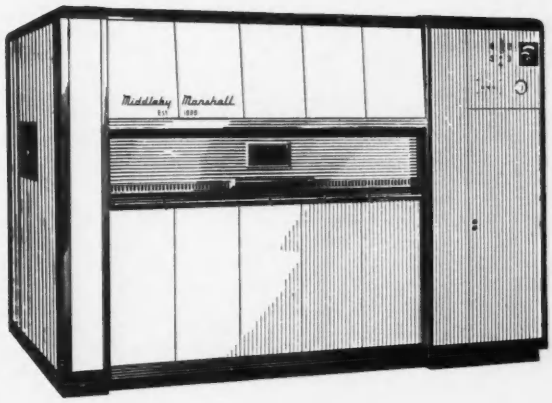

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With a new Middleby-Marshall Heavy-Duty oven you'll have bigger, JUICIER roasts, better baked goods — COOLER kitchens — plus REDUCED gas bills! More Schools, Hospitals, Hotels, Restaurants, Bakeries, etc., specify Middleby-Marshall Revolving Ovens than any other. They do this simply because M-M ovens are built for trouble-free performance year after year almost without end. For example, the patented Middleby-Marshall reel is so well made, it's guaranteed FOREVER!

Standard heavy-duty stabilization means no-tilt, no-spill trays. Controls easily accessible. Double suspension system—trays supported on both ends and hung on double reels to carry heaviest loads. All Automatic and Safety Controls included. All sizes and capacities available. Investigate a Middleby-Marshall oven now!

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☐ Model LUCKY 7—Auxiliary Oven—6 or 7 bun pans.
☐ Model H—Revolving Tray—8-80 pans.
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General Office ⇒ Main Plant: Chicago 6 ● Western Plant: Chubco, Oakland, Calif.

for a low temperature unit. The heavy duty construction assures efficiency at freezer temperatures. The MU line is designed to fit into the Koch Series M installations and to permit banking. MU cabinets are available in one-, two-, three-, or four-door sizes and are equipped with "Food Files," "Mobile Files," "Pan Files," and other accessories, and have cantilever legs.

California Prune Advisory Board is offering a collection of quantity recipes, "Magic in Meal Planning with California's Wonder Fruit." Printed on one side only, these recipes may be mounted on 5 by 8 in. cards for convenient filing.

A new mobile food service unit, the "Electra," is now in production, according to an announcement by *Crimsco, Inc.* Featured is a compartment designed to hold trays previously loaded with cold items to which the hot tray items may be added with ease. Other features are: an ice cream and cold nutrient section; removable beverage containers that may be fully immersed and run through all dishwashing systems; convenience outlet; increased vertical clearance between trays in the cold compartment, and added work space.

Louis Milani Foods, Inc., has introduced new "one-step" chiffon pie mixes. No cooking is necessary; just add hot water and beat in an electric mixer. Four flavors are offered: vanilla, chocolate, strawberry, and lemon. Six recipes using vanilla chiffon pie mix which may be adapted to the other flavors are available.

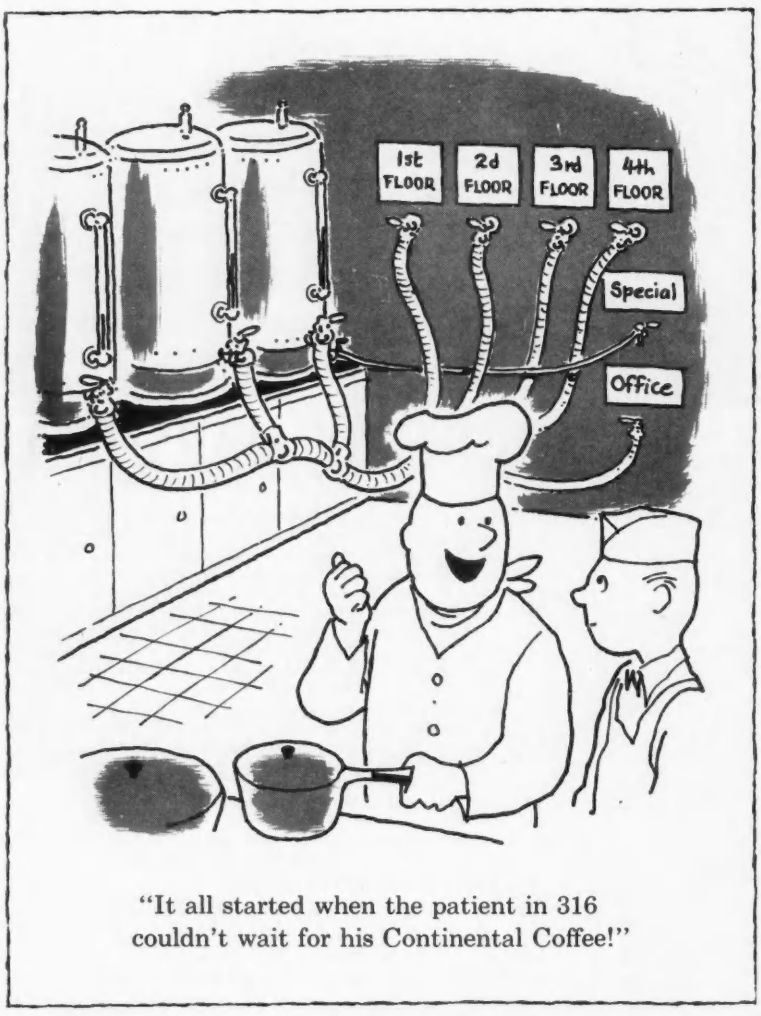
The new "A" series of dishwashers from *Vulcan-Hart* has three exclusive features: "Cloudburst" washing action with improved spray design, adjustable washing arms, and new increased pressures; "Lift-Drain" which eliminates line type drain valve and costly service; and "Splash Verter" for controlling splash-over of wash water to rinse tank where it occurs at rack level. Constructed of stainless steel, the unit has extra wide, boxed, non-leak access doors, front located overflow cap, drain screen, pump intake screen, and a new conveyor safety control.

Franco-American, brand name of *Campbell Soup Company*, has introduced a canned chicken gravy. With bits of tender chicken, there is nothing to add—just heat and stir.

Two basic models of a 60-in., two-tank combination conveyor dishwasher series have been announced by Toledo Kitchen Machines Division, *Toledo Scale Corporation*. The units are designed for maximum space saving and are capable of speeds up to 4805 dishes an hour. Model 2T-P-60R has a pre-wash pump which recirculates water from the final rinse overflow. Model 2T-P-60 is equipped with a fresh water pre-wash which uses water direct from the supply line. Both models feature the exclusive Toledo Panoramic door that provides an unobstructed view of the interior of the dishwasher, at the same time giving full access. Exterior is of stainless steel, corrosion-resistant construction.

New electric bake ovens, pizza ovens, and roast ovens, designed to be stacked in combination have been introduced by *Bakers Pride Oven Co., Inc.* The bake ovens are available in one-, two-, three-, or four-stack models. All units are equipped with steam injection nozzles for baking rolls and bread. Raw frozen food products may be taken directly from the freezer without thawing. The oven holds two 20 by 30 in. baking pans or twelve 10-in. fruit pies on each deck. Pizza ovens are also available in one-, two-, three-, or four-stack models for volume baking at high temperature. Two 20 by 30 in. pizza pans or twelve 10-in. pizzas can be accommodated on each transite deck. Roast ovens are available in one-, two-, or three-stack models holding two 20 by 30 in. roasting pans on each deck. All operate on 220 A.C. or 208 A.C., single or three phase.

A new double decker dish cart is being marketed by the *McClintock Manufacturing Company*, a division of Ekco Products Company. Made of highly polished, chrome plated steel alloy tubing, the new dish cart features two plastic containers, double the size of the ordinary dish container.



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